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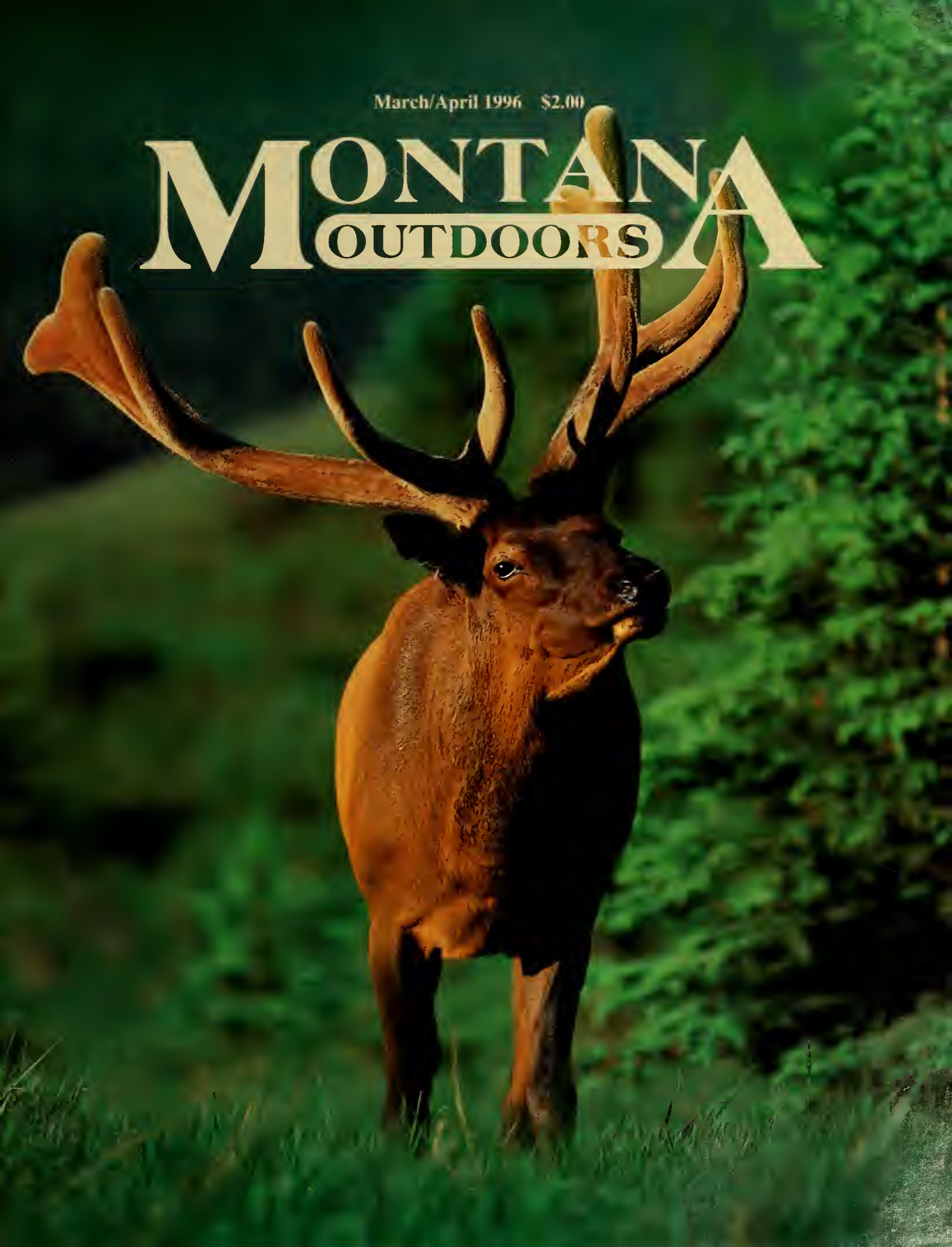
MONTANA OUTDOORS



Our Point of View

Last year, for the first time in a great many years, the rarest mammals on earth—black-footed ferrets—gave birth on the high plains of northeastern Montana.

As spring snow melts quietly into the forest floor, the most ferocious animals on the continent—grizzly bears—will emerge from their winter's sleep to dig for roots and capture food to replenish their strength.

Back from winter haunts in Mexico, peregrine falcons swoop down on prey from their lofty perches along the Missouri River at speeds approaching 200 miles per hour.

The black-footed ferret, grizzly bear, and peregrine falcon are rare species. They are among 12 animals and plants in Montana protected by federal and state law as threatened and endangered. Several more species are candidates for such protection.

How did they become so rare? Each story is a little different. Pesticides, conflict with man, loss of habitat, and competition from introduced species are some of the reasons. Most relate to some action we have taken.

In our time we have come face to face with the enormity of our influences on the land. We can harness the energy of mighty rivers. We can move mountains. We can live almost anywhere. What limits do we put on our influence? That question can be answered personally or by society through our laws. One such law is the Endangered Species Act.

No one wants to be responsible for causing extinction of a species. So why is the Endangered Species Act so volatile? It has become, for some, symbolic of a government out of control—putting the rights of animals over the rights of people to use their property as they see fit or to make a living off the land.

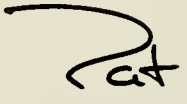
ALAN & SANDY CAREY

Black-footed ferret.

How are endangered species faring in Montana? Some are well along the road to recovery, others are not (see page 8). Besides the ecological problems these species face, there are few incentives for private landowners to preserve them. There has also been little opportunity for local or state action to preempt the listing of species until recently. The distinction between threatened and endangered species has been lost due to court action. All this and more contributes to the lack of trust and the uncertainty that surrounds these species.

While working with the U.S. Fish and Wildlife Service and many public and private groups to recover species, the State of Montana is also working to reform the Endangered Species Act to provide more incentives to landowners, to place more emphasis on preventing species from becoming threatened, and to provide the opportunity for state and local efforts to replace the need for federal action.

Having come face to face with the enormity of our influences on this earth, what will we do? Use laws like the Endangered Species Act as an emergency brake, jerking us to sudden stops? Or will we use our influence wisely so our children and their children will have the same choices that we have today?



Patrick J. Graham, Director
Montana Fish, Wildlife & Parks

MICHAEL S. QUINTON

Canada goose nesting is on the upswing at Canyon Ferry Wildlife Management Area (page 17).

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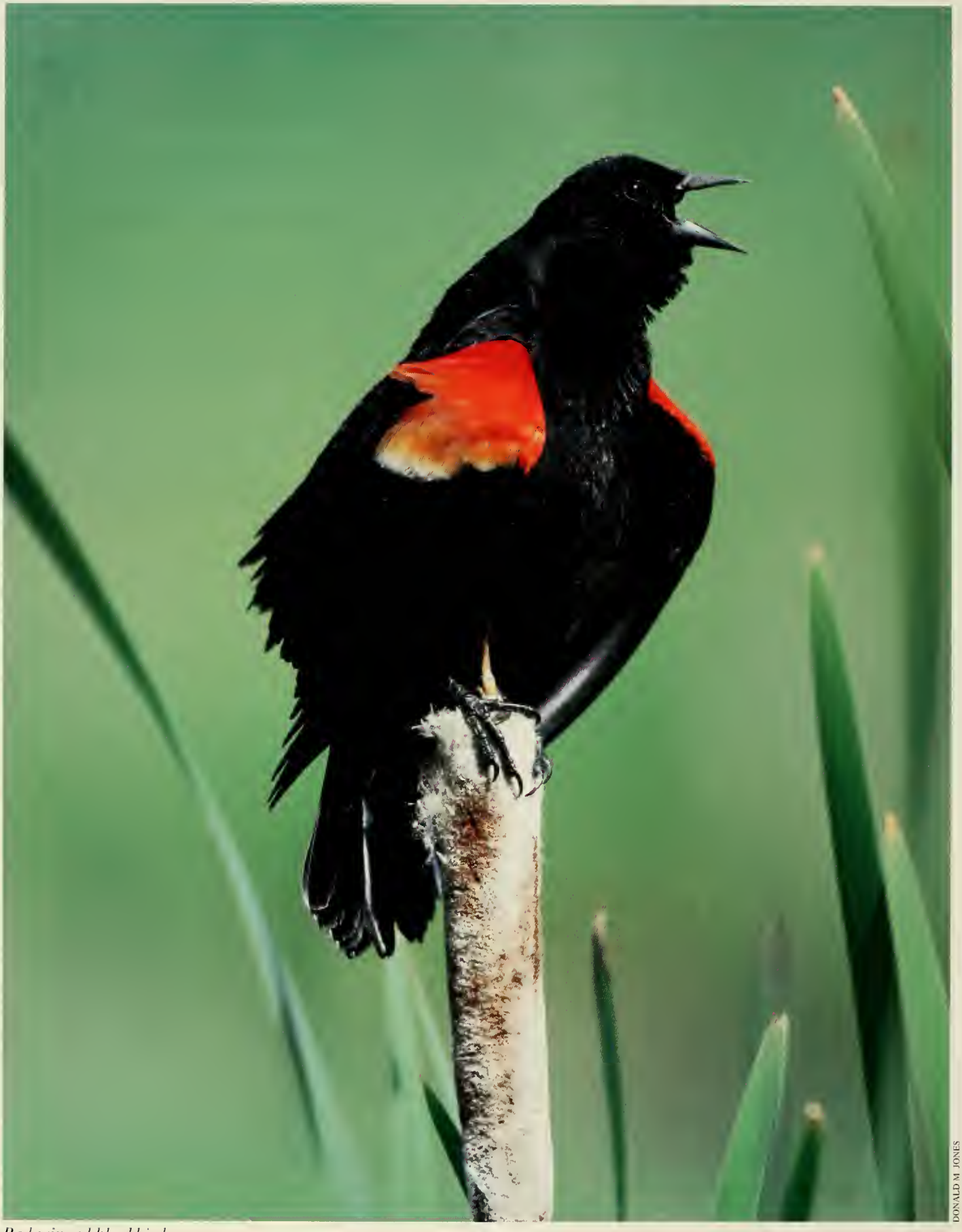


DONALD M JONES

Red-winged blackbird.

Wildlife Property Rights

by Sam Curtis

The shenanigans of spring have a way of catapulting some of us out of bed earlier than we'd like. Birds sing cacophonous songs from the trees. Coyotes howl in the hills. Neighbors pound fence posts across the road. Out in the fields prairie dogs jump and yip and wiggle their tails.

The crazy thing about this hubbub of noise and activity is that it all has the same purpose. It's not a plot to wake us up. It's a statement of ownership; it's a marking of turf; it's a proclamation of property rights. The birds and the coyotes and the neighbors and the prairie dogs are all saying: "This is *my* space! Trespassers be warned. There will be consequences if my boundaries are crossed. KEEP OUT OF HERE!"

Territorial creatures—there are a lot of them in Montana: shrews, wolves, geese, bullfrogs, trout, rabbits, eagles, lizards, cougars, marmots, sunfish, people. Their drive to hold and defend a piece of land, air, or water as a private preserve for the exclusive use of an individual or family is a basic tactic of survival in a world where space and resources are limited.

In scientific circles, defense is the operative word in defining territoriality in animals. A critter has to be willing to defend and fight for its real estate if that area is going to be considered a territory. The area that provides all the necessities of life (food, water, shelter, escape cover, breeding and rearing grounds) for an animal is called its home range. But only that part of the home range that is defended is considered its territory.

A squirrel, for example, may fight with a neighboring squirrel if it comes within 30 yards of her nest, but she may forage for nuts beyond that boundary and pay no attention to the same neighbor. The area within 30 yards of the squirrel's nest is her territory; the area she uses outside that boundary is her home range.

Territoriality is a species-specific arrangement, in most cases. A shrew does not consider a rabbit a trespasser. But by claiming, marking, and defending a territory against trespassers of its own species, animals gain a number of advantages.

The most important advantage may come in selecting a suitable mate. In many cases, a female simply ignores a male who doesn't hold property.

Male bullfrogs, for example, fight among each other for control of the sites where females prefer to lay eggs. The larger, more mature males bully their ways into the best sites. While they proclaim property ownership with a chorus of "kerchunks," females parade by to check out the quality of each territory before they finally choose their mates.

Sage grouse hens, on the other hand, seem more interested in the quality of the property

The birds and the coyotes and the neighbors and the prairie dogs are all saying: "This is *my* space!"

Pikas cut, dry, and stack grass from defended territories to make it through the winter.

MICHAEL S. QUINTON

CONRAD ROWE ©

When prey is abundant, the territorial needs of a wolf pack shrink.

owner than the quality of the property itself. Cocks gather in an arena, or strutting ground, that may be several hundred yards long and wide, but the hens just stand back until the males have strutted and fought out a hierarchy of positions. The most cocky and vigorous male, the one who fans out his feathers and pops his chest sacks most convincingly, ends up owning the key mating station, sometimes only a few yards wide. It is here that a majority of the hens flock to mate.

But holders of territory also have some advantages when it comes to securing food. By guarding exclusive hunting rights to an area, hunters such as cougars, eagles, wolves, and great-horned owls better their chances of securing enough food to survive and successfully rear their young. And food gatherers, like pikas, which cut, dry, and stack grass from defended territories, make it through the winter on food from their private land holdings.

In addition, territories offer security through familiarity. An animal that is willing to fight for a given space knows that space well. A rabbit learns the topography of its own turf, can get around in it easily and quickly, and knows the best spots for food, shelter, and escape. This territorial familiarity gives it an acute awareness and sensitivity to danger from intruders of its own kind and a better chance to avoid the fox.

In his intriguing book *The Territorial Imperative* (1966), Robert Ardrey claims that "in all territorial species...possession of a territory lends enhanced energy to the proprietor...the challenger is almost invariably defeated, the intruder expelled. In part, there seems some mysterious flow of energy and resolve which invests a proprietor on his home ground. But likewise, so marked is the inhibition lying on the intruder, so evident his sense of trespass, we may be permitted to wonder if in all territorial species there does not exist, more profound than simple learning,

GRASSHOPPER SPARROW PHOTO BY ALAN G. NELSON

We now know that the riotous chirpings and twitterings of birds in spring are not songs of simple delight but belligerent male shouts of: "This is my space. You guys keep out!"

some universal recognition of territorial rights."

At the very least, holding a territory is a way for a robin, or a pika, or a fox to live within a defined boundary without intense competition or interference from other members of its species. It's a way of spacing birds and animals, of spreading them around, of parceling out available resources.

Some ecologists see territoriality as a form of social behavior in which established territories fit together like pieces of a jig-saw puzzle to form a social structure with acceptable customs for marking and defending property rights. Within this structure, individuals or families hold property for their own use but still follow social conventions that allow them to coexist with their neighbors. It is in these social conventions of marking and defending territories that we find some of the most fascinating kinds of animal behavior.

Ornithologist Eliot Howard, in 1920, first recognized the existence of territoriality in songbirds when he observed individual males in spring singing from specific trees, bushes, and fence posts. Their songs, he discovered, were the males' proclamations of property ownership to other males. They were sung from prominent visible landmarks that staked out each homesteader's borders.

We now know that the riotous chirpings and twitterings of birds in spring are not songs of simple delight but belligerent male shouts of: "This is my space. You guys keep out!" The songs are loud and relentlessly repeated so neighboring males can learn the exact location of the songsters. And the songs of woodland birds, like wrens, may be loudest and longest because foliage makes it difficult for neighbors to see one another. And so the song itself becomes the territorial marker.

Experiments have shown that the effectiveness of these well-defined territories cannot be denied. For example, one researcher placed a robin in a cage in the bird's own territory. When a neighboring robin entered that territory, the caged bird chased the intruder off by the strength of his song alone. Another researcher, Arthur Allen of Cornell University, put a song sparrow in a cage in another sparrow's territory. When the owner of the territory tried to get at the bird in the cage, the

The drive to hold and defend a piece of land, air, or water is a basic tactic of survival in a world where space and resources are limited.

BALD EAGLE PHOTO BY MICHAEL S. QUINTON

caged bird, so frightened by its inability to escape, died of a heart attack.

But song is not the only way birds mark their turf. Downy woodpeckers announce their territories by pecking vigorously on boundary line trees and occasionally, with resounding effectiveness, by hammering on our metal stove pipes. They also wave their bills and raise the red feathers on the backs of their heads as a way of saying "stay away."

Among canids—foxes, coyotes, wolves—the best known custom for marking territory is the squirt of urine on a bush, tree, or rock. This, along with strategically placed piles of feces, serves as a kind of scent fence that has a sniffable sign reading NO TRESPASSING. Yaps, howls, barks, and yips also help clarify property boundaries.

Using a variation of the scent fence, a mountain lion scrapes together visible mounds of earth, twigs, and leaves along its boundaries and then adorns them with urine and feces as a way of laying claim to a hunting territory.

Although not hunters, pikas jealously guard their "farmlands." In addition to urine marking the haystacks they pile up for winter use, pikas rub against the stacks with a facial scent gland in a marking ritual called chinning. Their chirps, bleats, and whistles are also territorial announcements familiar to anyone who spends time in the mountains.

Not to be outdone, yellow-bellied marmots vocalize and tail-flag to make themselves conspicuous as they patrol their territorial borders. If another marmot comes too close, it is greeted with a tail-raised, hair-erected, tooth-chattering threat.

For sheer silliness, however, you can't beat the "jump-yip display" of prairie dogs guarding the entrances of their homes. The yip of one prairie dog leaping into the air with forelegs held high is enough to plunge an entire town of righteous home owners into jump-yipping their customary territorial displays.

Conventions are also adhered to in the defense of territory. Like fencers in a duel, fighting cock robins use their beaks for swords, thrusting and parrying to settle territorial disputes. Occasionally, we are reminded of the intensity of their resolve when a robin or some other bird repeatedly attacks its own reflection in a window of our home, assuming that its own image is that of an unwanted trespasser.

Crayfish, wedged into their territorial crevices among the rocks, first threaten intruders by waving their claws, and if that fails, they bite the would-be trespasser. Lizards resort to biting, too, but only after rivals circle and strut (and sometimes change colors) in a ritual intended to scare each other away. If neither backs down, they try to bite each other's snout. The first one to get a good chomp of his opponent usually wins.

In moving water, trout are extremely territorial and usually defend their space from a fixed "station" within a territory marked by prominent rocks, roots, and snags. All species of trout react in similar ways to intruders. When one trout crosses into another trout's territory, the owner confronts it with a "frontal threat display," arching his back, extending his fins, flaring his gill covers, and opening his mouth in an attempt to appear larger than life. Should the threat fail to

ALAN G. NELSON

Among canids like coyotes, the best known custom for marking territory is the squirt of urine on a bush, tree, or rock. Yaps, howls, barks, and yips also help clarify property boundaries.

rout the intruder, the proprietor immediately charges and tries to bite the trespasser. This is usually enough to send an intruder packing, but sometimes a fight breaks out in which participants circle, bite, and shake one another until one of them flees the contested territory.

Because breeding and rearing are at the root of much territorial behavior, the maintenance of territories is often a seasonal matter. Bird songs are most startlingly raucous on spring mornings since the urge to sing is largely influenced by birds' sex hormones. Later in the year, when birds have finished nesting, their singing dies down considerably.

Although not strictly territorial, whitetail and mule deer does and bucks do exhibit some seasonal territorial behavior. Does who are about to give birth in spring drive away their offspring of the previous year and go into seclusion in a well-defined birthing area. Dominant bucks, in the fall, make numerous and vigorous antler rubs on young trees which some researchers believe mark mini breeding territories where the buck is not challenged by subordinate bucks.

Other animals defend their territories all year long. Beaver use scent fences and the unmistakable whack of their tails to define boundaries of permanent family territories. And a pack of wolves continually marks borders as the size and shape of its territory fluctuates throughout the year.

The size of any animal's territory will often vary depending on the availability of food. When prey animals are abundant, the territorial needs of a wolf pack shrink considerably, only to expand again when prey populations are sparse.

The size of a territory may also depend on the availability of suitable habitat. For example, female and male mountain lions, both reclusive by nature, need up to 50 and 150 square miles respectively for their territories. As lion populations increase, young lions moving out to establish their own territories may find unoccupied habitat difficult to come by, especially with the increasing use of formerly wild land by that other territorial creature called man.

As the territorial nature of man and wildlife increasingly interact, it is often the wildlife that gets pushed out. Suitable duck and goose habitat shrinks when we drain wetlands. Mule deer lose critical winter and spring range as summer homes and subdivisions sprout on once-wild foothills.

With this intricate and often delicate mosaic of human and wildlife territories becoming increasingly crowded, we may do well to remember Robert Ardrey's words from *The Territorial Imperative*:

"Ownership of land is scarcely a human invention. Man's innumerable territorial expressions are human responses to an imperative lying with equal force on mockingbirds and men...." ■

MONTANA'S ENDANGERED SPECIES

A Status Report

by MIKE ADERHOLD

As of the end of 1995, 758 animals and plants were listed as endangered in the United States, and 204 animals and plants were listed as threatened. In Montana we now have seven animals classified as endangered, and five animals and plants classified as threatened. This article summarizes information available at the beginning of 1996 for Montana's endangered species; the May/June 1996 issue will include a similar summary for the state's threatened species.

BLACK-FOOTED FERRET

Twenty-nine years after listing, this two-pound weasel remains the rarest mammal in North America. Introduced diseases and a century of prairie dog control have brought it to the brink of extinction.

With the death of the last of nine captive ferrets at Patuxent Wildlife Research Center in 1978, most people feared the species had become extinct. Then in 1981, hopes were buoyed by discovery of a new population near Meeteetse, Wyoming (129 ferrets observed over a five-year period). Unfortunately, these ferrets, and the prairie dogs on which they preyed, were soon ravaged by sylvatic plague and canine distemper.

Again fearing extirpation of the species, biologists rounded up the 18 survivors. These became founders of a captive population that today numbers close to 300. For safety, these ferrets are now housed in nine facilities in six states and Canada.

Three free-roaming populations have been started by reintroducing animals from this captive population. In 1991, 49 ferrets were released into white-tailed prairie dog towns in Wyoming's Shirley Basin. Not unexpectedly, predation and starvation took a heavy toll. Additional ferrets were released there in 1992, 1993, and 1994.

In 1994 ferrets were also released into black-tailed prairie dog towns in Badlands National Park, South Dakota, and in northeastern Montana's C.M. Russell National Wildlife Refuge. Last summer, prior to additional releases in South Dakota and Montana (the Shirley Basin population was not augmented in 1995), the three populations contained about 10 ferrets each.

ALAN & SANDY CAREY

Black-footed ferret.

Montana's first release in 1994 followed long discussions involving local ranchers, tribal leaders, the Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (USFWS), National Biological Service (NBS), and Montana Fish, Wildlife & Parks (FWP). Of 35 kits and five adults released in October, only eight ferrets could be located in December. In spring of 1995, two or possibly three pairs produced at least five new kits.

In fall of 1995, an additional 36 ferrets were released in another prairie dog town several miles from the first site. Prior to this release, 66 coyotes were removed from a 50-section area surrounding the site, and an electric fence was strung around the prairie dog town for a few weeks to deter predators. In December of 1995, a survey of both release sites documented 24 ferrets (eight at the first site and 16 at the second).

None of the three reintroduced ferret populations is

well established at this time, and there is ongoing concern about the genetic viability of the captive population. The search continues for undiscovered black-footed ferret populations, but hopes are dampened by the knowledge that less than 8% of North America's historic prairie dog acreage remains.

In Montana, the goal is to reestablish two viable populations with a minimum of 50 breeding adults in each. Nationwide, the objective is to increase the captive population to 250 breeding adults and to establish a wild pre-breeding population of 1,500 adults in 10 or more locations by 2010.

Whooping Crane

The world whooping crane population now stands at 319, the highest level of the century. Last summer 47 pairs nested in and around Wood Buffalo National Park in the Northwest Territories and adjacent Alberta. This population of 190 whoopers—the only self-sustaining, wild population—winters at Aransas National Wildlife Refuge on the Texas coast.

An 18-year effort to start another wild population in Idaho using sandhill cranes to incubate whooping crane eggs was discontinued in 1988. Eighty-five chicks were fledged and reared by sandhill cranes between 1975 and 1988, but the mature whoopers never paired. The four remaining birds from this flock winter in New Mexico's Rio Grande Valley. A third wild population of 31 birds survives in Kissimmee Prairie, Florida, south of Orlando. This population, which originated in 1993 from birds reared in captivity, is nonmigratory.

Captive populations include a flock of 29 at the International Crane Foundation in Baraboo, Wisconsin; 19 birds at the Calgary Zoo; 72 birds at the Patuxent Environmental Science Center; and two pairs at the San Antonio Zoological Gardens.

In the mid-1800s, more than 1,000 whoopers nested in prairie marshes of north-central U.S. and southern Canada. These birds wintered primarily in the tall grass prairies of southwestern Louisiana. Advancing human settlement, agriculture, and perhaps the impacts of disease and occasional hunting and specimen collecting reduced whooping crane numbers through the late 1800s and early 1900s; by 1941, fewer than 20 individuals remained.

The biology of whooping cranes works against their rapid recovery. They don't reach sexual maturity until 4 or 5 years of age. Usually just two eggs are laid but only one chick is fledged, and often just every two or three years. In addition, they are handicapped by nesting so far north where the ice-free season lasts only four months. Their long migration exposes them to a variety of hazards: predation, disease, illegal shooting, and collision with man-made obstructions, especially powerlines.

CATHY & GORDON ILLG

Whooping crane.

Whooping cranes migrating between Canada and Texas frequently stop in northeastern Montana. Although no birds were observed there in 1995, in 1994 two whooping cranes were seen near Fort Peck and one in Sheridan County. In addition, cranes from southeastern Idaho occasionally wander west of Yellowstone Park to the Centennial Valley and Red Rock Lakes National Wildlife Refuge. The last several years a single whooper has visited this refuge with a flock of sandhill cranes.

American Peregrine Falcon

In June of 1995, the USFWS announced its intention to remove all races of the peregrine falcon in the lower 48 states from the endangered species list. A status review is underway and delisting could occur in 1996. If this happens, it will be the first time a Montana species has been removed from the list.

The American peregrine falcon inhabits most of North America, from the subarctic forest of Canada well into Mexico. Other races of the peregrine are found on every continent except Antarctica. Prior to 1950, it was among the world's most widely distributed birds.

The American race began a rapid decline about 1950, and by 1965 peregrines were nearly extinct through much of southeastern Canada and the U.S. east of the Mississippi River. In most of southwestern Canada and the northern Rocky Mountains, local populations were greatly depressed. Research implicated pesticides, particularly DDT and its metabolites. Eggshell thinning and nesting failures were widespread, and in some areas reproduction virtually ceased. Because of this, the peregrine was listed

TOM J. ULRICH

American peregrine falcon.

as endangered in the U.S. in 1970.

Following a ban on DDT in the U.S. in 1972, the peregrine began a slow recovery. Where populations had died out, attempts were made to reestablish them using captive-reared birds. But raising and producing peregrines in captivity proved difficult (between 1942 and 1970 only seven peregrines were successfully raised in captivity). In 1973, experimenting with artificial insemination and incubation, Tom Cade of Cornell University produced 20 young from three Arctic peregrines. That same year Jim Enderson of Colorado College raised the first American peregrines in captivity.

By 1974 biologists had begun experimental releases of captive-produced young using a technique called "hacking," which involves placing a pre-flight bird in a box with a screened side. The hack box is located in an area with plentiful prey. The young falcon is fed until its flight feathers mature, then the screen is removed. Slowly, as the bird develops the ability to hunt, it is weaned of provided food.

The Peregrine Fund, a nonprofit organization, was created at Cornell in 1970 by Professor Cade to promote this kind of restoration. In 1984 a permanent headquarters, the World Center for Birds of Prey, was built in Boise, Idaho. To date, more than 3,900 captive peregrines have been released to the wild through The Peregrine Fund, which has now extended its recovery work to over 24 species of eagles, hawks, falcons, and owls in more than 40 countries on six continents.

In Montana, early records of breeding peregrines include Big Spring Creek in Fergus County (1903), Battle Creek in Blaine County (1905), Squaw Creek in Gallatin County (1911), and the badlands of Custer and Dawson counties (1907). Little was known about their distribution, however, until they were nearly gone. A survey between 1973 and 1975 turned up 23 known or suspected nesting territories scattered throughout Montana. Only one territory was occupied in 1975, 1976, and 1977, and no young were produced in those years. Between 1978 and 1983 none of Montana's nesting territories was occupied during the breeding season (mid-March to mid-July). The number of known nesting territories now stands at 30, and in 1995 Montana had 16 nesting pairs of wild peregrines (the recovery goal for the state is a minimum of 20 pairs).

Most of Montana's peregrine recovery work has been under contract with The Peregrine Fund. Between 1981 and 1995, 448 peregrines were released in Montana at 23 sites; 346 of these birds successfully reached independence. In the last four years, an additional 30 peregrines have been released by Winifred falconer Ralph Rogers, under contract with the BLM and in cooperation with the Fund. Most of these birds have been released along the Wild and Scenic portion of the Missouri River.

The peregrine falcon remains Montana's foremost endangered species success story. From the beginning, the recovery program has enjoyed a high level of federal, state, and private sector cooperation. The nesting territory surveys and peregrine hacking work involved thousands of hours and dozens of volunteers. All of this has come together to benefit a species that in much of the country was on the verge of extinction just a quarter of a century ago.

GRAY WOLF

The USFWS listed the eastern timber wolf *(Canis lupus lycaon)* as endangered in 1967, and the northern Rocky Mountain subspecies (*Canis lupus irremotus*) as endangered in 1973. In 1978, the legal status of the gray wolf in North America was clarified by listing the Minnesota wolf population as threatened and all other members of the species *Canis lupus* south of Canada as endangered.

Information about wolves in Montana was recently compiled in a "Draft Montana Wolf Recovery and Management Plan" by Dr. Robert Ream, School of Forestry, University of Montana. It is hoped this FWP plan will establish a foundation for eventual state management of wolves in Montana. Following public review of the draft, FWP will publish a final plan in 1996.

Gray wolves were common throughout most of the Northwest into the early 1900s. Although wolf packs were eliminated from Montana by 1936, individual wolves were occasionally killed in the 1940s, 1950s, and 1960s. Wolves from Canada began to colonize Glacier National Park in 1979, and the first wolf den in the western U.S. in over 50 years was documented there in 1986. Since then, the Glacier population has increased to 50 to 60 animals, and many wolves from this population have dispersed to

other parts of northwestern Montana.

Northwest Montana Recovery Area.—Three packs now inhabit the North Fork of the Flathead Valley on the west side of Glacier National Park. A fourth pack resides in the Belly River drainage in the northeastern corner of the park. These animals spend most of their time in Canada and are not considered a Montana pack in terms of meeting the recovery goal.

Since wolves moved into Glacier, five other packs have become established: the Murphy Lake pack near Eureka; the Ninemile pack just west of Missoula; the Sawtooth pack along the Rocky Mountain Front west of Augusta; the Thompson River pack northeast of Thompson Falls; and the Boulder River pack north of Butte. Since 1995, persistent reports of wolves have also come from the Marion area west of Kalispell and the Lincoln area near Rogers Pass.

Yellowstone Experimental Population Area.—Fourteen wolves were reintroduced into Yellowstone National Park beginning in 1995. Three family groups were captured near Alberta's Jasper National Park, transported to Yellowstone, and placed in holding pens, where they were kept 10 weeks before release. Two of the females subsequently denned and produced nine pups in Montana.

Central Idaho Experimental Population Area.—Fifteen wolves were reintroduced into central Idaho from Canada and released in January of 1995. Many of these wolves moved north, some to the upper Bitterroot Valley. One has since been seen in Montana between Missoula and Drummond, and one was killed near Salmon, Idaho.

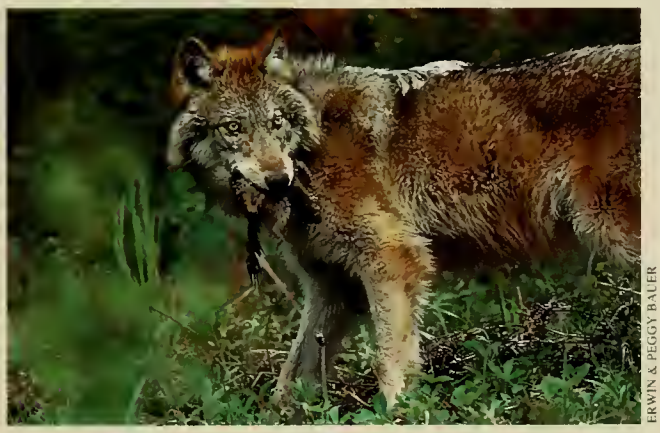
In 1996, the USFWS plans to release more wolves in Idaho and Yellowstone. The reintroduction plan calls for transferring 45 to 75 wolves from southwestern Canada over a 3- to 5-year period. Once the reintroduced wolves form two packs with each pack raising at least two pups for two consecutive years, reintroduction will cease and the populations will be allowed to move naturally toward recovery.

The wolves in the Yellowstone and central Idaho experimental areas are not classified as threatened or endangered. Only the northwest Montana population is classified as endangered. When that population reaches 10 breeding pairs of wolves for three consecutive years it can be downlisted from endangered to threatened. To achieve complete delisting, at least 10 breeding pairs of wolves must be maintained for three consecutive years in each of the three recovery areas. This could happen as early as 2003. Following delisting, the State of Montana would be responsible for wolf management.

Many people are concerned about the impact wolves may have on livestock. Although wolves feed primarily on big game animals, they occasionally kill livestock and other domestic animals. Between 1987 and October of 1995, 24 cattle and 12 sheep were known to be killed by wolves in Montana. Six of the cattle and 10 of the sheep were killed in 1987 before the USFWS control plan was written. Since then, control actions have been swift and efficient, greatly reducing the number of losses.

Like many wild animals, wolves are capable of posing a threat to human safety, but such occurrences are rare and unlikely. There are no documented cases of humans being killed or seriously injured by healthy, wild wolves in North America. It is important to note that the Endangered Species Act allows wolves to be killed in self defense or to protect human health and safety.

Ultimately, wolf management will be shaped by Montanans based on the best information available. As wolf numbers increase and their interactions with other wildlife and livestock become better understood, management will proceed accordingly.



ERWIN & PEGGY BAUER

Gray wolf.

LEAST TERN (INTERIOR POPULATION)

The interior population of least tern was listed as endangered in 1985. Populations along the East and West coasts are not endangered. The interior population, which once inhabited all the major river systems in the middle of the country, evolved to take advantage of constantly changing rivers and fish concentrated in pools by retreating summer flows. When river impoundment, channelization, and levee construction altered natural flow regimes and prevented flow into oxbows and backwaters, least terns rapidly declined.

Following their listing as endangered, least terns were first documented in Montana at Fort Peck Reservoir in 1987. To date, almost all the least terns in Montana have been found in three areas: the eastern end of Fort Peck Reservoir above Fort Peck Dam along the Big Dry Arm; the Missouri River below Fort Peck Dam; and the

CATHY & GORDON ILLG

Least tern.

Yellowstone River below Miles City.

In 1994, eight nests were found at Fort Peck Reservoir, all on a small island within sight of Fort Peck Dam. The eight nests were initiated by six pairs of least terns and were near the nests of some common terns. Only three nests were successful and, of six young produced, only two birds fledged. Nest and chick loss was probably due to gull predation. This was the third year least tern production was observed at Fort Peck Reservoir, and the most nests seen since surveys began in 1987.

In the Missouri River below Fort Peck Dam, the U.S. Army Corps of Engineers is trying to minimize impacts on least terns by reducing flows during the May-through-August nesting period. In 1994, biologists surveying a 126-mile stretch of the Missouri below Fort Peck Dam found 23 least tern nests in five locations, all in one 31-mile reach. Fourteen of the nests were successful; of 28 young produced, at least 19 fledged. This is the largest number of least terns produced in the lower Missouri since surveys began in 1988.

In 1994 a study of least tern and piping plover reproduction was begun on the Yellowstone River between Miles City and Crane, Montana (143 miles). That year, 17 tern nests on nine islands in a 98-mile stretch produced 45 young. In all, 40 adults were observed.

Delisting the least tern can be considered when the interior population reaches 7,000 and is stable for 10 years, as verified by four censuses. The goal for the Missouri River system is 2,100 birds. Montana, which is at the western edge of the range, has a recovery goal of 50 birds. This was exceeded in 1989, 1990, 1991, 1992, and again in 1994, when a record 51 pairs produced 81 young.

WHITE STURGEON (KOOTENAI RIVER POPULATION)

The Kootenai River population of the white sturgeon was listed as endangered in 1994. This fish has been declining for at least four decades and recruitment has been insignificant since 1974.

Historically, white sturgeon ran along the Pacific Coast from the Aleutian Islands to central California, spawning mostly in the Fraser, the Columbia, and the Sacramento-San Joaquin river systems. The largest specimen on record, taken near the mouth of the Fraser River in 1897, weighed 1,387 pounds.

Of 18 landlocked white sturgeon populations, the Kootenai is the only one naturally isolated. All the others have been isolated by hydroelectric and irrigation facilities. It is believed the Kootenai River population was separated from the rest of the Columbia drainage by the last period of glaciation at least 10,000 years ago.

Kootenai sturgeon began declining in the 1950s and 1960s as water quality deteriorated due to pollution and as loss of river sloughs and marshes left fewer rearing areas for juvenile fish. The new Libby Dam in 1975 drastically changed the Kootenai River ecosystem by disrupting the natural flow regime and altering seasonal and daily water temperatures. Nutrient retention behind the dam severely affects aquatic life, hence food resources, in the river, as evidenced by reduced numbers and growth rates of kokanee salmon, trout, and whitefish.

Kootenai River sturgeon are restricted to 168 river miles between Kootenai Falls, 31 miles below Libby Dam, and Kootenay Lake in British Columbia. Bonnington Falls below Kootenay Lake historically has isolated this population from the lower Columbia River drainage.

According to state, federal, and Kootenai Tribe of Idaho biologists, the Kootenai River sturgeon population declined from an estimated 1,194 fish in 1982 to 785 in 1993. They predict the population will further decline to about 650 by 1998.

Montana has less than 30 miles of white sturgeon habitat. In 1980, only a handful of adults were still trying

PAUL VALCARCE/IDFG

White sturgeon.

to spawn in this section of river. In 1990, a four-foot-long sturgeon was illegally killed in the mouth of the Yaak River just above its confluence with the Kootenai. A single adult was observed several times in Montana between 1990 and 1992.

White sturgeon fishing in the British Columbia portion of the Kootenai system was halted in 1990. Idaho ended the sport harvest of white sturgeon in the Kootenai in 1984, but still allows catch-and-release fishing. The white sturgeon season has been closed in Montana since 1979.

Lack of reproduction is the most immediate threat to the Kootenai sturgeon population. Despite experimental discharges from Libby Dam designed to benefit spawning and egg development, recruitment has not improved.

Since 1990, the Kootenai Tribe of Idaho has propagated white sturgeon in captivity. Thousands of fish have been produced and to date 205 juvenile white sturgeon from wild stock have been released into the Kootenai River. Ten of these fish have been released in Montana; all 10 moved downstream into Idaho.

A team of fisheries and hydroelectric experts is now drafting a white sturgeon recovery plan. Due out this year, the plan will consider future river flows, habitat improvements, and the role of aquaculture.

PALLID STURGEON

The pallid sturgeon is the larger of two sturgeons historically found in the upper Missouri River. The other is the more common shovelnose sturgeon. The pallid sturgeon was not recognized as a species until 1905 and that classification is still being debated. Three genetic studies conducted to assess the relationship of the two species have been inconclusive. The pallid may just be a race of the shovelnose sturgeon geographically isolated for a relatively short time, or vice versa.

JIM HEMELT

Pallid sturgeon.

The pallid sturgeon was classified as endangered in 1990. Its historic range included the middle and lower Mississippi River, the Missouri River, and lower reaches of the Platte, Kansas, and Yellowstone rivers. In Montana, pallids have been found in the Missouri River between the mouth of the Marias River and Fort Peck Reservoir; between Fort Peck Dam and the North Dakota border; and in the 70 miles of the Yellowstone River below the mouth of the Powder. Their preferred habitat is the bottom of large, turbid, relatively warm, free-flowing rivers.

Man's alteration of large river systems is believed to be the primary cause of the pallid sturgeon's decline. Most of the mainstem Missouri has been dammed, channelized, and diked, and many of the braided channels, sandbars, and backwaters are gone. Deposition of woody debris, organic material, and inorganic sediments has been curtailed. As a result, habitat diversity and productivity have been severely impaired.

The immediate goal for this fish is to prevent extinction by establishing three captive brood stock populations in separate hatcheries. The long-term objective is downlisting and eventual delisting through protection and habitat restoration in six recovery areas, two of which are in Montana: the Missouri River above Fort Peck Reservoir, and the lower reach of the Yellowstone and the Missouri River below Fort Peck Dam.

Natural reproduction has failed for at least one generation throughout the pallid sturgeon's range. Artificial propagation is being used to supplement wild populations until suitable spawning conditions in the wild can be restored. About 7,000 hatchery-reared pallids were released into the Mississippi River in 1994. To avoid potential hazards associated with inbreeding, domestication, and exposure to disease, extreme care is being taken in handling cultured stocks.

Attempts to spawn pallids taken from the Missouri and Yellowstone rivers in Montana have not been successful to date. When young are produced, the plan is to release them above Fort Peck Reservoir in a portion of the Missouri where 27 pallids have been recorded since 1990. The pallid sturgeon population in the Missouri River above Fort Peck is estimated at less than 100.

In the Missouri River below Fort Peck Dam downstream to Lake Sakakawea (including the Yellowstone River below the mouth of the Powder River), 150 pallids have been handled since 1990 (this number includes 40 recaptures). The population estimate for these river stretches is 250 pallids.

Borgreen's Canvasback

First place—Jim Borgreen

s Win '96 Stamp Contest

by William Phippen

Jim Borgreen's rendition of two canvasback ducks gracing the sky against a backdrop of Montana's Rocky Mountain Front at Freezout Lake has been selected as the subject of Montana's 1996 state waterfowl stamp.

Paintings by Robert Schlenker of Bozeman and Cliff Rossberg of Great Falls earned second and third places, respectively.

Borgreen, a Montana-born wildlife artist and educator, has been a teacher at Fergus County High School in Lewistown for 21 years. He specializes in watercolor, pen and pencil drawings, and paintings emphasizing central Montana's big game and upland game birds. His works have been accepted into numerous national and regional art exhibitions, including the C.M. Russell Auction in Great Falls, The National Audubon Wildlife Art Show, and the Western Heritage Artists' Show.

"One of my earliest and fondest memories is accompanying my dad on a duck hunt at Freezout Lake in the mid-1950s," says Borgreen. "I've made many other trips to Montana's wetlands since then, some alone, some with family and friends, and now with my own son and daughter."

Borgreen acknowledges the importance of having his work depicted as the 1996 state waterfowl stamp. "The fact that I can still do the above after 40 years is what makes winning this contest such an honor for me," he explains. "Now my art, a product of all those years of observing, can contribute to the enhancement and preservation of wetlands and the wildlife that inhabit them. Hopefully, this fall many young Montanans watched their first early morning flight of ducks lifting off the water. If we all do our part, like those before us, they will be able to share these resources with their children 40 years from now."

Robert Schlenker, a 40-year-old professional artist, grew up in central North Dakota and moved to Montana almost 20 years ago. An avid waterfowl hunter, he began "stomping around lakes and sloughs at a young age," and that experience gave him a good understanding of both waterfowl and their habitat needs. "I feel the waterfowl stamp program is great for waterfowl and hope that in the future it gains more popularity not only with hunters but with the general public," he says.

Cliff Rossberg is a 23-year-old artist and part-time pharmacist who lives in Great Falls. "Montana is truly a painter's paradise," he says. "I am constantly visualizing paintings wherever I go." As a member and sponsor of both Ducks Unlimited and Pheasants Forever, Rossberg intends to keep duck stamp

Second place—Robert Schlenker

Third place—Cliff Rossberg

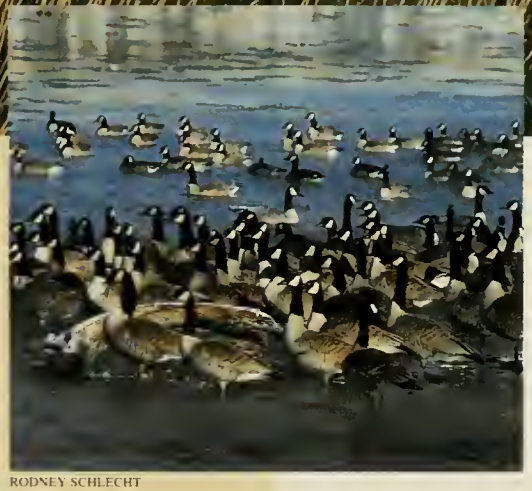
competitions and the revenues they provide for habitat as his primary focus. "Spending time outdoors has given me strong feelings toward this world and the value of things in the wild that I've chosen to share."

Since 1986, waterfowl hunters in Montana have been required to purchase a state waterfowl stamp as well as a federal "duck stamp." The 1985 Montana Legislature gave Montana Fish, Wildlife & Parks authority to produce and sell a waterfowl hunting stamp and related items. In 1990, more than 15,500 stamps were sold to Montana waterfowl hunters and and another 8,000 to collectors throughout the country.

Proceeds from the sale of the waterfowl stamps and artwork are used to develop and enhance Montana's wetlands for the long-term benefit of waterfowl and other wildlife on private, federal, and state-owned lands. ■

Dust To Ducks

TOM CARLSEN



RODNEY SCHLECHT

From pelicans to Canada geese, Canyon Ferry Wildlife Management Area supports a rich diversity of bird life.

by Bernie Kuntz

DOWN IN THE BROAD VALLEY of the Missouri River between the Elkhorn Mountains on the west and the Big Belt Mountains to the east lies Canyon Ferry Wildlife Management Area (WMA). Located a mile north of Townsend on the Missouri River delta at the south end of Canyon Ferry Reservoir, the 5,000-acre WMA is a mixture of river bottom and upland habitats, including cottonwoods, willows, river islands, farm ground, shelterbelts, and grasslands.

The dam forming Canyon Ferry Reservoir was built in 1954 by the U.S. Bureau of Reclamation (BuRec). Three years later, Montana Fish, Wildlife & Parks (FWP) accepted wildlife management responsibilities for the WMA with the signing of a memorandum of understanding.

The WMA's unique character was formed in the 1970s when BuRec built an intricate system of dikes to solve a severe dust problem created when overwinter drawdowns of the reservoir exposed silt deposits in the delta to strong winds. Biologists from FWP and Montana State University provided valuable input into the design of the dike system so that it would benefit wildlife as well as meet dust control objectives. Silt was dredged from the shallow river delta, then permanently covered by water in four ponds averaging 400 acres each. During the dredging process, small islands were constructed to serve as nesting sites for a variety of bird species. Since then, the dike system and its man-made islands, together with natural river islands and river bottom cover, have provided

MICHAEL S. QUINTON

Since construction of an elaborate system of dikes, ponds, and islands at the south end of Canyon Ferry Reservoir in the 1970s, Canada goose nesting has increased tenfold.

habitat for numerous wildlife species.

The east side of Canyon Ferry WMA also includes 1,112 acres of agricultural ground that is leased to local farmers. In addition to producing grain and hay, these leases demonstrate how agricultural land can produce wildlife. In a cooperative effort with lessees, FWP has planted shelterbelts and nesting cover on idle ground adjacent to croplands using Upland Game Bird Habitat Enhancement Program funds. In addition, approximately 10% of the grain planted on each lease is left unharvested for use by wildlife during fall and winter.

A management plan for the WMA was completed in 1992. The plan identifies specific goals, objectives, and strategies for managing the various wildlife species and habitats found on the WMA.

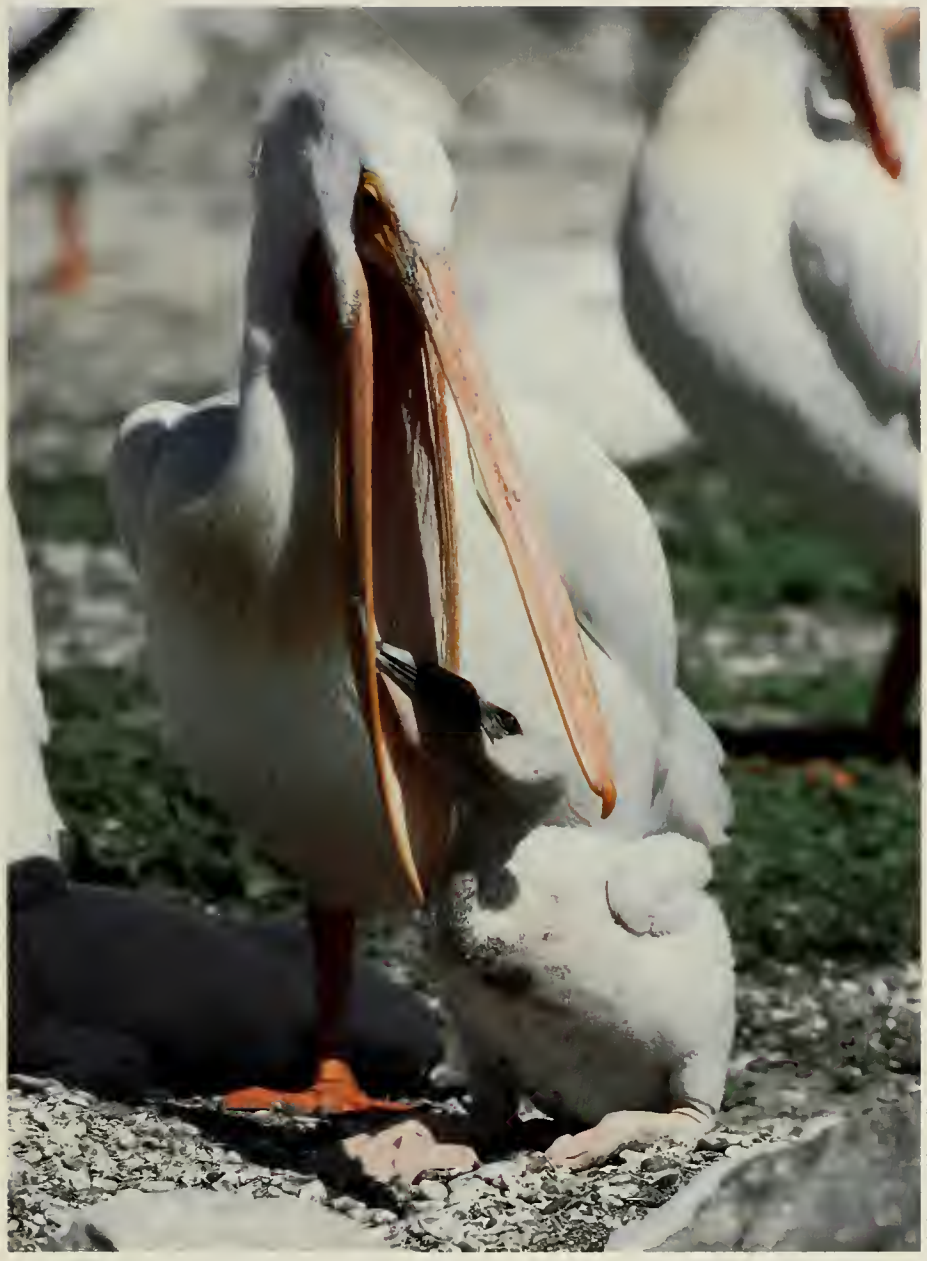
One primary objective is control of noxious weeds. FWP utilizes an integrated program that includes annual herbicide spraying and release of biocontrol agents (insects). To date, nine species of insects affecting three species of noxious weeds have been released. Insects are used primarily in areas sensitive to water contamination or in areas inaccessible to spray equipment. Weed management does not necessarily seek to eradicate all weeds on the WMA, but takes into account the fact that some plants considered to be weeds actually provide valuable food and cover for wildlife.

Area wildlife biologist and unit manager Tom Carlsen has worked at Canyon Ferry for the last 9 years. Carlsen and the unit managers who preceded him have monitored the Canada goose population on the WMA since 1974. Prior to dike construction, the area supported 40 to 50 nesting pairs of Canada geese; today, however, with some 325 artificial islands scattered throughout the four ponds, an additional 550 pairs of geese nest on the WMA.

According to Carlsen, "The nice thing about the dike system is the canals coming off the Missouri River that feed the ponds. This allows us to control water levels to keep the islands in the ponds secure from mammalian predators like red fox, raccoons, and the whole array of predators you would associate with river bottoms. For this reason, birds nesting on these man-made islands generally have a higher nest success than birds using natural habitat."

Since dike construction, management emphasis has been on improving habitat to maximize waterfowl production and provide for hunter recreation. As a result, Canyon Ferry WMA has become a popular spot for waterfowl and upland bird hunters. FWP personnel have conducted check stations on the opening two days of the waterfowl season and the opening day of the pheasant season since the early 1980s. In 1995 almost 360 hunters showed up the first two days of the waterfowl season, taking approximately 200 geese and 359 ducks.

While Canada geese have been the big success story at Canyon Ferry WMA, during the last decade more emphasis has been placed on improving habitat for ducks, using FWP and Ducks Unlimited (DU) funds. In 1987, a small pond project was completed to provide breeding habitat for ducks, and during the winter of 1989 DU funded a project that placed topsoil on islands in one of the ponds, allowing quality nesting cover to grow for ducks.



ALAN & SANDY CAREY

HARRY ENGELS

BILL MARCHEL

Pelicans (left), double crested cormorants (top), and wood ducks (above) are a few of the birds that nest at Canyon Ferry WMA.

During winter of 1990, three acres of new islands were built as a mitigation project for loss of river island habitat resulting from a hydroelectric retrofit of nearby Toston Dam by the Department of Natural Resources and Conservation. In 1991, 50 acres of dense nesting cover were seeded using funds from the state waterfowl stamp program.

Carlsen also conducts a winter track count on the WMA. After a fresh snow, he counts tracks made by white-tailed deer that feed in agricultural fields at night and move to adjacent dense willows to bed down during the day. The area typically supports 200 to 300 whitetails. Deer hunting is restricted to use of archery equipment, shotguns, muzzleloaders, and traditional handguns.

FWP wildlife technician Rick Northrup does much of the farming on habitat development projects on the WMA and also helped write the management plan for the area. He and Carlsen have been monitoring nongame bird populations on the area such as double-crested cormorants, American white pelicans, and Caspian terns. In 1995, there were 559 cormorant, 1,084 pelican, and 41 Caspian tern nests located on islands in the dike system.

In cooperation with the Montana Natural Heritage Program, Carlsen and Northrup have banded 200 to 300 pelicans per year the last four years to determine seasonal distribution. "It's not like banding waterfowl where you get hunter band returns," Carlsen says. "It's a slow process. You are relying on actual observation of the band by people for band return information."

Carlsen also points out that as plant communities develop over time, more nongame species are beginning to utilize the project. This has attracted public interest in viewing wildlife. In fact, the *Montana Wildlife Viewing Guide* calls Canyon Ferry WMA "an exceptional wetland and river bottom area...a good place to see migrating waterfowl and many nesting birds: Canada geese, double-crested cormorants, white pelicans, Caspian terns, and osprey." Additional wildlife that may be seen in the river bottom habitats include moose and river otter. Wood ducks are also becoming more common in backwater areas where FWP personnel have installed nesting boxes.

The best place to see mammals is the delta portion of the WMA, which can be reached by a number of roads off the east side of U.S. Highway 287. The best areas for viewing waterfowl and shorebirds are ponds 2 and 3 on the east side of the WMA (see map). Motorized travel is not allowed on most of the WMA, however, so wildlife watchers and hunters should be prepared to do some walking. (A detailed map of the WMA is available from the FWP office or the U.S. Forest Service office in Townsend).

In January of 1996, FWP purchased 129 acres of the 51 Ranch adjacent to the west side of the WMA. This acquisition was made with money from FWP's Habitat Montana Program, which is funded from hunter license fees. The property, which historically was used for winter pasture, had been subdivided and residential development could have seriously conflicted with wildlife management and hunter use of the area. This parcel will provide a buffer for pond 4 and will be developed by FWP personnel into habitats that will benefit a variety of wildlife species.

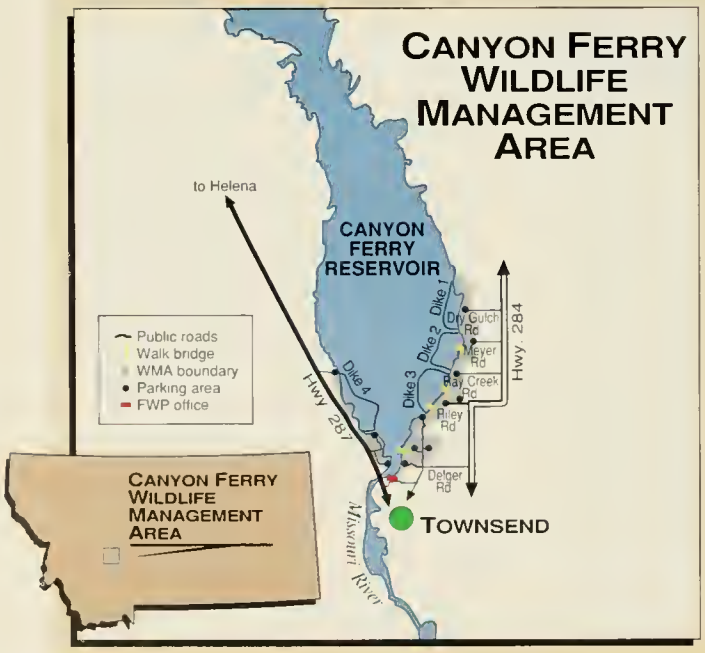
Carlsen expects that as habitats continue to develop naturally and through management improvement, Canyon Ferry WMA will become even more attractive to wildlife. "The potential is almost unlimited," he says. "This is a prime area where we can use management techniques and proper stewardship of agricultural lands to really benefit wildlife of all kinds." ■

DONALD M. JONES

The WMA supports 200 to 300 white-tailed deer.

Canyon Ferry Wildlife Management Area

Location: In Broadwater County, 1 mile north of Townsend at the lower (south) end of Canyon Ferry Reservoir.



Size: 5,000 acres.

Acquisition Date: Administered by the U.S. Bureau of Reclamation; FWP accepted wildlife management responsibilities under a memorandum of understanding in 1957.

Access: From U.S. Highway 287 on the west and Highway 284 on the east, Canyon Ferry WMA can be reached by several gravel roads. Also, from Townsend, one can follow U.S. Highway 12 east for a short distance, then turn north onto Harrison Road. Gravel roads heading off this road lead to the WMA.

Management Goal: To provide and improve habitat for ducks, geese, and nongame species, and to provide wildlife viewing and hunting opportunities.

Hunting Opportunities: Archery, shotgun, muzzleloader, and traditional handgun for white-tailed deer; bird hunting for pheasants, ducks, and Canada geese.

Wildlife Viewing: Canyon Ferry WMA is an excellent place to see migrating waterfowl and many nesting birds, including Canada geese, double-crested cormorants, American white pelicans, Caspian terns, and ospreys. Commonly seen mammals include white-tailed deer, beaver, raccoon, mink, and red fox. River otters and moose are seen infrequently.

Getting Together

Montana Fish, Wildlife & Parks and the U.S. Forest Service team up to manage the Bob

by John Fraley and Greg Warren

THE BOB MARSHALL WILDERNESS COMPLEX is a special place among unique areas. The flagship of the nation's 92-million-acre wilderness system, the "Bob" supports thousands of native elk and bull trout, vital habitat for the threatened grizzly bear, and the finest westslope cutthroat fishery in the world. Features like the serpentine Chinese Wall and the clear waters of the Sun and Flathead rivers create passion in the minds of visitors and a desire to preserve the area's values.

Stewards of the Bob can point to a number of management successes over the years. Elk have not always been abundant, and records indicate that uncontrolled shooting and habitat loss contributed to their near-demise by the early 1900s. For a month during the fall of 1905 and again in 1906, biologist

NELSON KENTER

Backbone of the Bob, the Chinese Wall dominates the wilderness landscape.

Through conservation and habitat management, elk have been brought back from near-extinction to record numbers in the Montana Rockies. Today, people come from around the world to enjoy the Bob's legendary hunting and wildlife viewing.

CONRAD ROWE ©

Ellers Koch rode horseback through what is now the Bob Marshall Wilderness. Describing the trip years later in *The Journal of Wildlife Management*, Koch wrote that "with the exception of one goat, [I] never saw or got a shot at a single big game animal...." Today, roughly 10,000 elk live at least part of the year in the Bob.

The area's resources have become more valuable over time, as opportunities for recreation in wild areas have diminished. Wilderness supporters have become more insistent that the best possible stewardship be applied to the Bob, and that they have more of a say in how the area is managed. This has prompted the U.S. Forest Service (USFS) and Montana Fish, Wildlife & Parks (FWP) to strive for closer cooperation and better ways of including the public in decision-making. One initiative is a fish, wildlife, and habitat management framework adopted last spring that promises to begin a new era of cooperation between resource agencies and the public.

Like many turf-breaking efforts, the management framework required long months of work and some concessions on the part of both agencies. While division between agencies with differing responsibilities and outlooks is natural, both parties recognized that closer cooperation could bring stewardship of the Bob to a new level.

Although the USFS administers most wildernesses in the West, state agencies traditionally have managed fish and wildlife. This shared responsibility has often led to inconsistent policies and has been a source of frustration for managers and the public.

Bob Marshall Wilderness Complex

In 1940, a year after Robert Marshall's death, three primitive areas were combined to form the Bob Marshall Wilderness. With passage of the Wilderness Act in 1964, the area received permanent protection as part of the national wilderness system. In the 1970s, Congress designated the Scapegoat Wilderness to the south and the Great Bear Wilderness to the north. This 1.5-million-acre area is now collectively known as the Bob Marshall Wilderness Complex.

Geography: The terrain is typical of glaciated mountain lands, with high alpine basins and broad, U-shaped valleys. Elevations range from 3,900 feet to 9,400 feet. The Chinese Wall on the crest of the Continental Divide is the area's dominant geologic feature. Rivers west of the divide include Wild and Scenic sections of the Middle and South Forks of the Flathead, and the North Fork of the Blackfoot; east of the divide, rivers include the Sun, Teton, and Dearborn. Elevation, precipitation, and temperature extremes, coupled with the area's geologic history, have created diverse plant and animal communities.

Wildlife and Fish: The Bob provides habitat for at least 250 species, including the threatened grizzly bear

Clearly, management of fish, wildlife, habitat, and visitor use can't be separated.

During meetings held by the USFS in the 1980s, citizens began to call for a specific wildlife plan for the Bob and better cooperation between FWP and USFS. By 1987 an FWP team had produced a draft plan, but it met with a cool reception. In 1991 a final plan was released, but some officials of both agencies found it unacceptable and the plan languished for several years.

Jim Posewitz, major author of FWP's early plan for the Bob, was frustrated by the outcome. "I felt that we delivered a good document, but that I had to shove it across the line as I was on my way out the door" (Posewitz retired in 1993). He says that state officials were lukewarm and federal managers denied the document's validity because it didn't fit with what they expected his committee would come up with. "The report was their child," says Posewitz, "but they tried to deny its parentage."

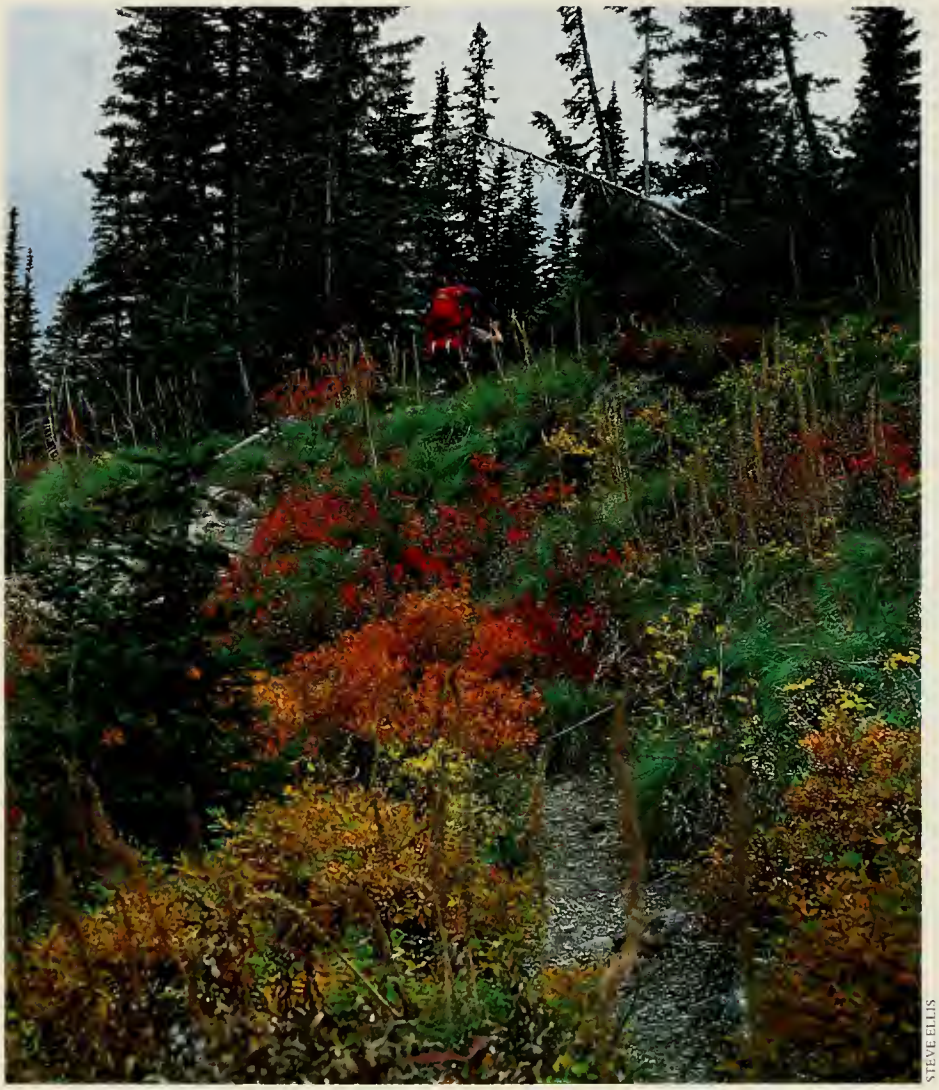
Finally, the spring thaw of 1994 brought a corresponding thaw in agency relations regarding the Bob. The two agencies took another look and signed a pledge to cooperate. The pledge called for a process to resolve fish, wildlife, and habitat management issues and promised development of a mutually acceptable fish and wildlife plan.

A team of FWP and USFS represen-

and bald eagle, and the endangered gray wolf and peregrine falcon. The U.S. Fish & Wildlife Service cooperates in managing these four species. The area also provides habitat for mountain goats, elk, deer, moose, mountain lions, black bears, bighorn sheep, numerous smaller animals, and an abundance of birds. The lakes, streams, and rivers are best known for native bull trout and westslope cutthroat trout.

Recreation: Visitors can access the Bob from more than 40 trailheads around the perimeter. Dominant activities include packstring and backpacking trips, hunting, fishing, and photography. Visitation has mushroomed in the last two decades. While only about 500 people visited the Bob in 1943, the number of visitors each year now exceeds 100,000!

DIANE ENSIGN



STEVE ELLIS

Backpackers can choose from more than 100 trails that wind through the wilderness complex.

tatives went to work, taking on the task in addition to their regular jobs. Team members recognized that it would be impossible to produce a detailed fish and wildlife plan because of the diversity of resources and issues across the Bob. They also believed that the attempt to produce such a plan probably led to failure of earlier efforts. After much deliberation, the team opted to craft a general framework for managing fish, wildlife, and habitat that would provide joint responsibility and shared guidelines. They further reasoned that managers could design specific plans and projects with these agreed-to guidelines in mind.

The team's approach turned out to be the right one. After a dozen meetings, a dozen drafts, and the work of two dozen public and agency reviewers, the final framework was signed in April of 1995 by supervisors of the Flathead, Helena, Lewis and Clark, and Lolo national forests, and supervisors of FWP regions in western, northwestern, and north-central Montana. The framework is now the official guideline for management of fish, wildlife, and habitat in the Bob.

"I believe this step shows that our agencies are of the same mind on the need to cooperate more fully in the Bob," says FWP's Region 2 Supervisor Rich Clough. "This framework sets the tone for a genuine working relationship and information-sharing relevant to fish, wildlife, habitat, and enforcement. We hope this partnership will help us solve some problems that have divided us in the past." Clough notes that the framework discards the notion that the state is concerned only with wildlife and the USFS only with land.

Flathead Forest Supervisor Joel Holtrop agrees. "To meet our wilderness mission we must work together more effectively. This framework shows the commitment of both agencies to ecosystem management. It will help us resolve fish, wildlife, and habitat issues in the wilderness ecosystem up front before they become problems."

Coincidentally, about a month before the agreement was signed, state and federal officials, led by USFS Chief Jack Ward Thomas, jointly issued a letter urging agency managers to "work together to meet wilderness and fisheries management objectives whether managing for endangered species recovery, community diversity, or for recreational fishing opportunities." The timing of this directive was uncanny, and the framework immediately became a model that attracted notice around the West.

First of its kind in the nation, the framework establishes:

- A collective management vision agreeable to both agencies.
- Shared fish, wildlife, and habitat goals.
- Sixteen sets of specific guidelines on management of fish, wildlife, and habitat in the complex, including fish stocking, wildlife and wildland law enforcement, visitor education, fire management, and control of noxious weeds.
- An administrative partnership between the two agencies—i.e. FWP has a say in habitat issues and the Forest Service has a say in fish and wildlife issues.
- A standard process for judging project proposals brought forward by either agency.

Thus far, shared management seems to be working. For example, FWP wardens and forest officers around the Bob now meet regularly to discuss joint enforcement of wildlife and visitor use laws. This ensures a consistent educa-

tional message to the public and avoids duplication of effort. In 1995, FWP wardens traveled nearly 1,800 trail miles in the Bob and checked more than 200 outfitted and private fishing and hunting camps. Wardens and USFS officers teamed up on many of these efforts.

Biologists, too have begun cooperative projects, working together last summer to open a logjam blocking bull trout spawning habitat in a wilderness tributary and developing a management plan for the Bob's mountain lakes. All these activities have been accomplished in the spirit of preserving wilderness values.

Public reaction to the framework has been mostly positive. The citizens who originally called for a cooperative wildlife plan have found the framework acceptable so far, but only if both agencies remain committed to making it work.

It has even received guarded praise from outspoken wilderness advocate Gene Persha, a history and government teacher from Edina, Minnesota. Persha has visited the Bob many times over the past 20 years and often voices opinions about its management. Like Socrates in his dealings with the rulers of ancient Athens, Persha has been something of a gadfly in his relationship with the USFS. He has mounted a persistent campaign to open management of the Bob to other agencies, and to the public near and far.

"Hiking trips in the Bob have been some of the most meaningful experiences of my life," he explains. "I want to give something back."

Persha points out that members of the public represent an untapped resource that could aid in obtaining funds and other resources to help manage the complex. He believes that ideas too often come from the top of agency hierarchies rather than from the grassroots level. He feels that government officials assume the public knows less than bureaucrats do about an issue.

"Management is only successful," says Persha, "when you seek input from the public. You must develop ownership and support of the majority of the people for your actions."

Persha views the framework as a benchmark in agency cooperation, but feels citizen members should be added to the Bob's decision-making group. In this way he believes agencies and wilderness users can forge a more direct link.

Wilderness outfitter Jack Rich and his family have hosted visitors in the Bob for decades. A big, friendly man, Rich loves the Bob just a little less than he loves his wife and children. He has provided valuable input on the area's management for many years and recently helped prepare the fisheries plan for the South Fork of the Flathead.

"One of the major problems I see," he says, "is the conflict of interest between FWP's goals of producing hunting and fishing recreation and the Forest Service's philosophy of allowing nature to dominate."

JOHN PRALEY

Remote and inviting, George Lake typifies the solitude and aesthetic beauty that inspired Bob Marshall to work for wilderness preservation.

What is wilderness?

Wilderness protection, like public stewardship of fish and wildlife, is uniquely American. The 1964 Wilderness Act was enacted "in order to assure that an increasing population...does not occupy and modify all areas within the United States...leaving no lands designated for preservation and protection in their natural condition...." Wilderness is defined as "an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain."

Of the many people who advanced the concept of wilderness preservation, Aldo Leopold and Robert Marshall are perhaps best known. In 1921, Leopold published in *Journal of Forestry* his suggestions for a wilderness policy and defined wilderness as "a continuous stretch of country preserved in its natural state, open to lawful hunting and fishing, big enough to absorb a two week's pack trip, kept devoid of roads, artificial trails, cottages, or other works of man." Leopold later became known for the land ethic concept, which extended the idea of ethics to the natural world. Wilderness occupies a unique niche in Leopold's land ethic as the model of ecological health.

Robert Marshall worked for the U.S. Forest Service in Idaho and Montana from 1925 to 1928, and in 1937 became Chief of Recreation and Lands in the agency's Washington office. He was responsible for designation of "primitive areas" that later became the nation's first permanent wilderness areas. A prodigious walker, Marshall once hiked *in a single day* from the Black Bear Guard Station on the South Fork of the Flathead River to the top of the Chinese Wall, along the crest of the wall and back to the guard station, a distance of 42 miles. Bob Marshall defined wilderness based on the physical challenges and aesthetic beauty it offered.

As an example, Rich points to reluctance of the USFS to ignite fires to replenish deer and elk winter range and forage inside the wilderness. Also, he notes that almost all the mountain lakes supporting fish in the Bob were originally fishless. "Fish stocking has built a traditional use with most visitors," he says, "and it should continue." Rich notes that the Wilderness Act acknowledges the importance of recreation in wilderness areas. "Sometimes it seems that managers with a more purist attitude look at humans as intruders rather than a legitimate part of the system."

Citing the framework as a step toward better cooperation, Rich calls for more participation by FWP and the public in the Bob's management. "Without it," he says, "you're just playing with half a deck."

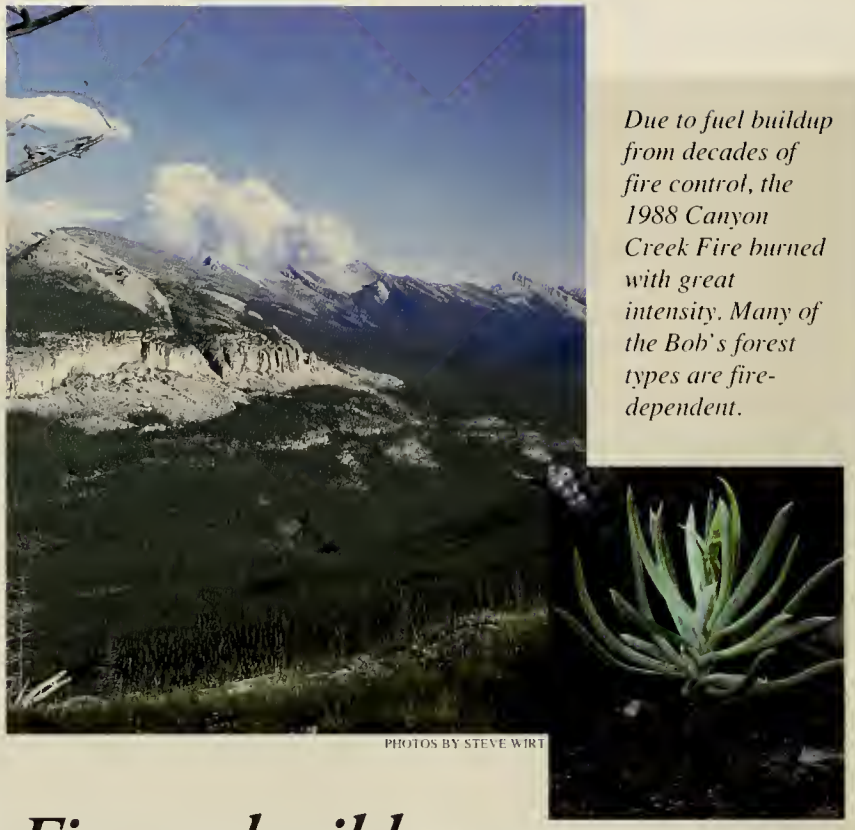
Jim Posewitz, too, believes that agencies must allow the public greater influence in managing the Bob. "Wilderness was not designed by federal managers," he says. "It was clearly a public creation. We need broader thinking. Citizens must be absolutely a part of it, not tangled in the process, not part of some focus group, listened to and then ignored."

Although critical of the process, Posewitz agrees that the framework offers promise for better cooperation and public involvement. But he feels the guidelines fall short in addressing lands adjoining the Bob. "How can you preach ecosystem management when you ignore winter habitat outside the Bob that 80 percent of the wilderness elk depend on?" he asks. "Management of those lands has to be consistent with wilderness prineiples, even if the land is outside the wilderness boundary."

Bud Moore, long-time Swan Valley resident, trapper, and wilderness enthusiast, also has taken a keen interest in the framework. "The two agencies just have to work together, the closer, the better," he says, noting the futility of separately managing fish and wildlife. "If one outfit owns the cattle and the other outfit owns the ranch, you're going to have problems."

Moore's main interests in the process revolve around the guidelines on fire and trapping. He has long been an advocate of fire's natural role in wilderness. "In the past, managers considered fire as public enemy number one," he says. "But the Wilderness Act tells us that nature has full swing and to put out fires is contrary to the law." Moore points out that fire control has led to unnatural fuel accumulations and changes in the landscape, and he supports the fire guidelines set forth in the framework.

In the case of trapping, however, Moore is not a happy camper. The conservative guidelines are designed to avoid attaching the stigma of "commercial activity" to recreational trapping in the Bob. In the past, Moore was able to get permission to exceed the 14-day camp limit for the purpose of trapping marten and other furbearers. Trappers can no longer secure this exception, and he feels this makes it almost impossible to operate in all but the fringes of the Bob. "Let there be no doubt," he says, "that for a few it is the ultimate primitive experience. Those of us who trap in wilderness are motivated by something more than economic returns for our work. We are hooked on



PHOTOS BY STEVE WIRT

Due to fuel buildup from decades of fire control, the 1988 Canyon Creek Fire burned with great intensity. Many of the Bob's forest types are fire-dependent.

Fire and wilderness

In wilderness, where natural processes dominate, fire is as vital as rain and snow. The Bob Marshall has many forest communities that have evolved with fire and depend on it for periodic renewal. Fire control over the last 80 years has altered and delayed these natural fire cycles, resulting in heavy fuel accumulations and unnatural changes in plant communities. They also have worsened the impact of white pine blister rust, an introduced disease that is decimating the Bob's whitebark pine.

The goal of wilderness fire management is to restore fire as nearly as possible to its natural role and, where necessary, to remedy the past effects of fire control. In the Bob, lightning-caused fires are being allowed to burn where feasible, but with regard for public safety and effects on adjacent lands.

the spell that wildness creates on natural land."

Clearly, the management framework is not universally accepted by every member of the public or every agency manager. But most people believe the agreement is a step toward better cooperation and that it will be good for the Bob. USFS and FWP leaders have referred to the approach as "consistent with ecosystem management principles, with sound science, and with common sense."

Citizens have long played an important role in shaping the Bob, and have established a proud tradition of activism. Their voices "haunt the deep shadows of the spruce thickets," wrote Jim Posewitz, "and sing across barren ridges." As citizens join agency managers in new initiatives, like the fish, wildlife and habitat framework, the quality of the Bob's management can only get better. ■

CONRAD ROWE ©

Long-time Bob Marshall outfitter Jack Rich leads a packstring in the wilderness.

For a copy of the "Fish, Wildlife and Habitat Framework for the Bob Marshall Wilderness Complex," contact: Flathead National Forest, 1935 3rd Ave. E., Kalispell, MT 59901; or FWP Region 1, 490 N. Meridian Road, Kalispell, MT 59901.

To stock or not to stock?

Fish stocking is one of the most controversial management issues in the Bob and other wildernesses across the West. Critics contend it distorts the naturalness of ecosystems and disturbs the solitude of visitors (aircraft are typically used to deliver fish to mountain lakes). Proponents feel stocking can supplement native fish populations and provide better angling.

Biologists are becoming increasingly aware of the ecological value of fishless lakes, formerly referred to as "barren." Fishless lakes can support high numbers of native amphibians and invertebrate animals. Under the concept of ecosystem management, these animals, formerly ignored, are recognized as integral parts of the system.

In 1994 managers poisoned the brook trout in Devine Lake, returning it to a fishless condition, to reduce chances of these non-native fish moving downstream into a tributary of the South Fork of the Flathead and interbreeding with native bull trout, a state "species of special concern." The question now is whether Devine Lake should be stocked with native westslope cutthroat trout to provide angling recreation and a refuge for the species, or whether it should remain fishless.

In the months ahead, managers will consider a proposal by concerned citizens to restock the lake; the proposal will offer a good test of the management framework's guidelines and processes.

JOHN FRALEY

Biologists apply a fish toxin to remove non-native brook trout from Devine Lake. About 40 of the Bob's mountain lakes support fish through natural reproduction or stocking, while three times that many are fishless.

Mama and the

story by TERRI ADAMS, illustrations by DAVE MCGEE

FIFTEEN FEET AHEAD, Gary turned and motioned for us to get down and come...fast!

For the last hour and a half I had tried to keep up with Gary and my husband as they long-legged it through the beautiful Yellowstone river bottom country, and now my short, little legs were starting to complain. Come fast? Hadn't I been moving as fast as I could all evening?

My husband started his sneak through the spring growth to join Gary. He looked ahead, then back at me, repeating Gary's motion, only this time with more force.

Alright, I thought, I'll humor them. At least we were headed in the direction of the car. Dutifully I bent over and began my camo-clad impersonation of Groucho Marx.

I caught up with them 25 yards later. Gary turned his dark beard toward us. "They're just on the other side of the log," he whispered. I looked to where last year's flood had left the barkless remains of a giant cottonwood, 75 yards away. It glistened white in the golden afternoon sun. Somehow I knew we were going to have to continue our Groucho walk.

As we made our way through the knotted grasses, looking like the entire Marx brothers entourage, my husband turned around. "Get ready," he mouthed. "When we get there you won't have much time to shoot."

I nodded, but still wasn't convinced. The birds would be gone by the time we got there. After all, the guys were taking *moi* hunting. The only hunting I had ever done in my life was for reading glasses, pacifiers, and baby bottles. To me, 4X4 was 16, and the first time I saw my husband in camouflage I asked him what he had on. He replied that it was camo. "No silly," I responded. "Not your cologne, your clothes." He married me anyway.

Now, nine years later, I had learned a little about hunting and a lot about motherhood. My husband rarely asked me to join him in the outdoors anymore because I always seemed to have an excuse: "Who's going to make supper?" "Who's going to do the dishes?" "Who's going to watch the baby?" "Who's going to listen to the house settle?"

I liked the outdoors, but as the mother of three young boys under the age of five, I didn't feel I had the time to go traipsing over the river and through the woods. I'd sing the song if I wanted to feel woodsy.

Finally, though, spring turkey season arrived, and with it a house full of hunters, all telling stories around a midnight table after each long day of hunting. I rocked our newborn son to sleep in the other room and listened to the laughter penetrate the walls. It was starting to penetrate me as well. Inside, I knew I wanted to be around that table, too.

I approached my husband.

"Find a babysitter and we'll go," he responded.

A babysitter? My mind came to a screeching halt. My husband's expression needed no explanation. I began to add up babysitting fees for three children, a hunting license and turkey tag, not to mention the camouflage outfit he insisted I buy. This turkey had better taste as good as filet mignon, I decided, because it was going to cost at least that much!

My husband and his friend, Gary Brien, assured me they could get me onto

Bird

some birds. I was not so sure. Yes, I could sneak up on a 2-year-old dumping flour onto the kitchen floor, but a flock of turkeys in the Yellowstone river bottom? That was a little out of my element.

Finally, on Monday afternoon, I was ready. I blinked back the tears as I kissed my newborn for what I was convinced was the very last time, and left to chase a bird I had only seen in the wild one time in my entire life. To me, turkeys were about as believable as a Dr. Suess Wump.

Three-quarters of an hour later, we were leaving the road, and the car, behind. As we labored deeper into the woods, I was convinced their willingness to take me, a housewife, hunting was just an excuse to get themselves out into the woods again without feeling guilty. And, as they tested the freshness of turkey guano with the toes of their boots, I was sure they were out there for themselves and not for me. After all, I spent a good deal of my time as a mother cleaning that stuff off of shoes! I never would have allowed someone to step in it on purpose if I were calling the shots!

At first I hustled along as best I could, always behind, and always hurrying. Then it happened. With a smile, my husband looked back at me hiking somewhere up the trail and said, "You hear that? That's our bird."

Ah-ha! I knew it! I was right! He used the term "our bird." He *was* hunting for himself!

Gary left to circle around behind the birds and try to drive them toward us. As we moved quietly through the woods, a movement ahead of my husband and me caught our attention. A doe, her body dripping a rich caramel color, took a step forward and dropped her delicate head to eat.

We both froze in the middle of a game trail to watch. She grazed only 30 feet away from us, her soft ears and tail swishing in the evening sun.

Almost as if we were looking at a Magic Eye picture, we began to see shapes creeping out of the woods around us. First a yearling fawn, only a few steps to the right of the doe, caught our attention. It had been there all along, but we just hadn't seen it until we let our eyes relax to the magic of the woods.

A chipmunk sat at our feet and chewed on its supper. A few breaths later, we noticed another doe, feeding to the left of the first one.

"They don't know we're here," my husband breathed.

As we watched that tiny clearing just feet in front of us, two more deer became visible to our eyes. For 10 minutes we feasted on the quietness of their presence and the richness of the woods.

"This is really what makes it all worthwhile," my husband silently mouthed. I had to agree.

Suddenly, though, the feast was interrupted as a turkey scurried into the clearing. Its beard was visible even to me.

Gary had pushed the flock straight to us.

At the sudden movement, the deer vanished into the forest. The tom disappeared into some undergrowth and the chase was on. That ol' tom was experienced at playing hide-and-seek and stayed hidden. But one thing did emerge from that unsuccessful attempt...my adrenaline. This stuff in the woods could be fun! For the first time in nine years, I was starting to understand why my husband found life so fulfilling in the outdoors. For the first time, I was learning the thrill of having a pheasant explode from a tangle of underbrush at your feet, of smelling the wooded earth, and seeing an unmarred world.

As we continued through the beauty, the sun began to show signs of going to bed. Gary and Troy decided we had better head back to the car. I was frustrated.

"Don't give up," my husband said. "More opportunities are lost walking back to the car discouraged than any other time."

I wasn't so sure. We had heard turkeys all around us, but they were merely laughing at this pair of hunters shadowed by a housewife in a camouflage hat who sidestepped turkey guano and thought a cow track was a "really, really big deer track."

We began our walk back. My legs were tired, my mind was wandering, and my hope had vanished when Gary made that frantic motion ahead of us to get down fast. I wasn't so sure I wanted to go through the routine again only to be disappointed. Finally, though, I decided to try one last time.

Gary was already waiting at the fallen cottonwood when we arrived. The turkeys had disappeared behind some brush but he guessed they would be emerging about 120 yards away.

Knowing I might not get the kinds of opportunities seasoned hunters get, my husband had prepared me for both close-range action and long distance shooting. We had a 12-gauge shotgun and a .22-250 with a synthetic stock. If Gary's prediction about the position of the birds was correct, I would need the rifle.*

Sure enough, the birds entered the clearing right where Gary said they would. As luck would have it, the cottonwood made a perfect rest. I brought the rifle up and found the scope. But, to my horror, the birds were running!

Hey, my mind yelled, nobody told me they would be moving! They were supposed to stand still and present a nice, motionless, broadside shot just like all the pictures I saw in magazines and the targets I had practiced on. These jakes and toms were anything but motionless.

"Pick a spot on your bird and then shoot," my husband reminded me. For an instant I hesitated.

The first tom disappeared into the trees, the second bird was on his way. I couldn't see any of the others in the scope and I knew time was rapidly running into the woods. I found the second bird. He was running up the trail and I knew my only chance would be gone in a few more, bouncing, bobbing strides.

No Annie Oakley, I knew I could never hit the bird as he was running. I hoped he would run into my bullet instead. But hit or miss, it would be my only chance. I put the crosshairs on his back and pulled the trigger.

Instantly the scope was filled with the sight of a bird spinning down off the hill away from the trees.

"You got him!" Gary's mouth was hanging open in disbelief. He looked at my husband, his eyes wide. My husband looked at me. His eyes, too, were wide with surprise, but they also sparkled with pride.

"You got him!" He grinned as he gave me a bear hug. And while I just smiled and nodded in dumbfounded amazement, I really wanted to squeal with delight and cartwheel over the log. I had my first turkey!

As we returned to the car, the first trophy of my new life hanging off my husband's shoulders, I knew that bird had, in a strange way, bagged me too. I was hooked. I had only one question for him. "When can I do this again?"

He looked at me. "In Montana you can go turkey hunting this fall, too. Why, do you want to go?" A smile started to tug across his face. "Is it a date?"

I nodded, my tired legs skimming through the grass. "It's a date," I said. ■

**Beginning in 1996, rifles will no longer be legal for spring turkey hunting in Montana.—Editor*

SEVEN MONTANANS INDUCTED INTO HUNTING HALL OF FAME

Seven Montanans were inducted into the Montana Hunting Hall of Fame last fall at the conclusion of the state's annual observance of Hunting Heritage Week, according to Harold Kelso of the Billings Rod and Gun Club, chairman of the awards program.

Inducted at the annual awards banquet held in Billings were:

Lifetime Achievement Awards: Henry Schwenke of Sidney, a bowhunter since 1928; and Dale A. Burk of Stevensville, a writer, longtime hunting advocate, and executive director of The Hunter's Alliance.

Conservationist of the Year: Jim Posewitz of Helena, executive director of Orion—the Hunter's Institute, whose 32-year career with Montana Fish, Wildlife & Parks was marked by many successful wildlife conservation programs.

Hunter of the Year: Troy Adams of Sidney, a newspaper columnist and wildlife artist.

Young Hunter of the Year: Anthony "Tony" Mendenhall of Billings.

In addition, posthumous awards were made to recognize two individuals who contributed to the state's hunting heritage before the awards program was initiated: the late Leonard Pawlowski of Circle and the late Fred Carver of Billings.

Pictured from left are Mrs. Leonard Pawlowski of Circle; Jim Posewitz of Helena; Anthony "Tony" Mendenhall of Billings; Henry Schwenke of Sidney; Dale A. Burk of Stevensville; and Troy Adams of Sidney.

Pawlowski was cited for a lifetime of involvement in hunter education programs, for support of hunting and wildlife conservation in eastern Montana, and for contributing a large firearms collection to the McCone County Museum for all to enjoy. Carver, long one of Montana's most active sportsman-conservationists, was cited for his contributions over many years on public access, wildlife conservation, and habitat issues.

Each inductee's name will be engraved on the large Montana Hunting Hall of Fame plaque that hangs in the meeting room of the Montana Fish, Wildlife & Parks Commission in Helena.

OUTDOOR REPORT BROADCAST SCHEDULE

FWP's weekly video news program, called the "Outdoor Report," airs on all Montana television stations during their evening newscasts. The broadcast schedule for these two-minute productions is as follows:

LOCATION/ STATION	DAY/ NEWSCAST TIME
Billings:	
KTVQ-TV (CBS)	Thursday/10:00 p.m.
KULR-TV (NBC)	Thursday/Friday 5:30 & 10:00 p.m.
Great Falls:	
KFBB-TV (ABC)	Thursday 5:30 p.m.
KRTV-TV (CBS)	Thursday 5:30 p.m. Sun/10:00 p.m.
Missoula/Kalispell:	
KECI-TV (NBC)	Thursday/10:00 p.m.
KPAX-TV (CBS)	Thursday/10:00 p.m.
Butte-Bozeman:	
KXLF-TV (CBS)	Friday/10:00 p.m.
Helena:	
KTVH-TV (NBC)	Thursday/5:30 p.m.

MO VIDEO SUBSCRIPTIONS AVAILABLE

For an annual price of $25, you'll receive three *Montana Outdoors* videos, one every fall, winter, and spring. Each video explores several high-profile issues that fuel FWP's actions and policies. The 1996 winter edition includes segments on nonresident variable priced hunting licenses and fisheries enhancement projects. To subscribe, send your check to: Video Production Unit; MT Fish, Wildlife & Parks; 930 W. Custer Ave.; Helena, MT 59620; (406) 444-2733.

CORRECTION:

A word was omitted in the byline for "Harmony at Hauser" on page 34 of the November/December 1995 issue. The byline should have read, "Al Harmata, Assistant Research Professor, Montana State University." We regret the error.

Take a Close Look

As colorfully shown in this poster depicting wildlife, plants, and insects of the lower Missouri and Yellowstone rivers, the Montana prairie teems with life. Fort Peck artist Nadine Pickthorn created the artwork for the poster to share her love of eastern Montana's wildlife with school children across the state. To obtain a free copy, write Kurt Cunningham, Project WILD coordinator, Montana Fish, Wildlife & Parks, 1420 East Sixth Avenue; Helena, MT 59620.

The Montana Chapter of the American Fisheries Society sponsored the poster to highlight the importance of preserving healthy habitats for fish and wildlife. Funding came from a variety of sources, including: Montana Fish, Wildlife & Parks, the Montana State Parks and Wildlife Interpretive Association, the Bureau of Land

ILLUSTRATION BY A. NADINE PICKTHORN © 1995

Management, the U.S. Forest Service, the Bureau of Indian Affairs, the U.S. Fish and Wildlife Service, Sport Fish Restoration, Joseph Urbani and Associates, and the Natural Resource and Conservation Service.

Key to Habitat Poster

INSECTS
1. Dragonfly (adult)
2. Mayfly (adult)
3. Caddisfly (adult)
4. Grasshopper
5. Ladybug
6. Mosquito
7. Diving beetle (Dytiscidae)
8. Dragonfly nymph
9. Water strider
10. Backswimmer
11. Water boatman
12. Mayfly nymph
13. Caddisfly larvae (net-building)
14. Caddisfly larvae (case-building)

ANNELIDS
15. Leech
16. Earthworm

NEMATOMORPHA
17. Horsehair worms

MOLLUSKS
18. Snail
19. Freshwater mussel

CRUSTACEANS
20. Crayfish

AMPHIBIANS
21. Leopard frog
22. Tadpole

REPTILES
23. Prairie rattlesnake
24. Painted turtle

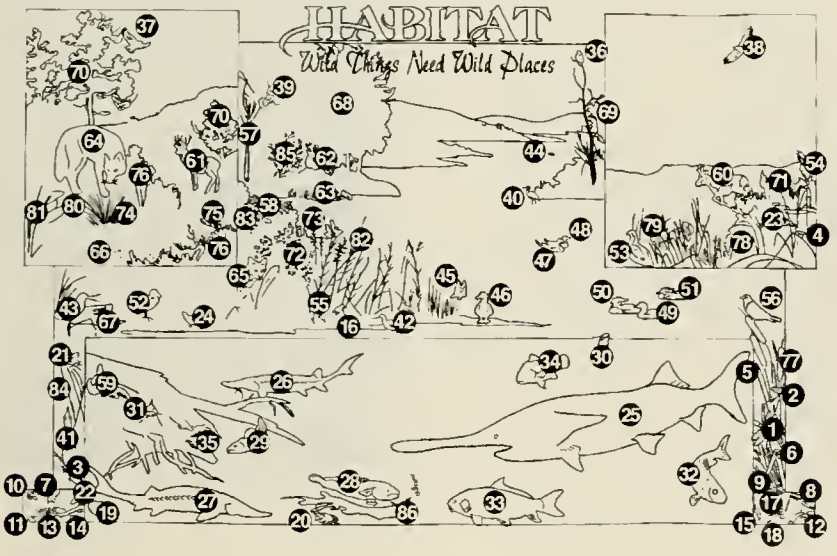
NATIVE FISH SPECIES
25. Paddlefish
26. Pallid sturgeon
27. Shovelnose sturgeon
28. Burbot (ling)
29. Sauger
30. Goldeye
31. Channel cat

BIRDS
36. Bald eagle
37. Golden eagle
38. Ferruginous hawk
39. Great horned owl
40. Great blue heron
41. American bittern
42. American avocet
43. Marbled godwit
44. White pelican
45. Mallard (drake)
46. Mallard (hen)
47. Pintail (drake)
48. Pintail (hen)
49. Common merganser (drake)
50. Common merganser (hen)
51. Hooded merganser (drake)
52. American coot
53. Sage grouse
54. Western meadowlark
55. American robin
56. Yellow-headed blackbird
57. Red-headed woodpecker
58. Black-capped chickadee

MAMMALS
59. Bison (skull)
60. Pronghorn (antelope)
61. Mule deer
62. White-tailed deer
63. Beaver (and lodge)
64. Coyote
65. Red fox
66. Mountain cottontail rabbit (tracks)
67. Long-tail weasel

PLANTS (Terrestrial)
68. Cottonwood
69. Green ash
70. Ponderosa pine
71. Big sagebrush
72. Wild rose (pink flower)
73. Willow
74. Yucca
75. Skunkbush
76. Rocky mountain juniper
77. Cattails
78. Blue grama
79. Needle and thread grass (wavy)
80. Lichen (orange on rock)
81. Western wheatgrass (2 locations)
82. Showy milkweed (white flower)
83. Chokecherry
84. Bulrush
85. Bulberry

PLANTS (Aquatic)
86. Filamentous green algae



FLUVIAL ARCTIC GRAYLING POISED FOR RECOVERY

by Patrick A. Byorth
Fisheries Biologist
Fisheries Division, Region 3

Five years ago the future looked grim for the last river-dwelling, or fluvial, Arctic grayling in the lower 48 states. Not only had river grayling been restricted to 8% of their native range in the upper Missouri Basin, but the sole remaining population was plummeting toward extinction. In the last refugium of fluvial grayling—the upper Big Hole River—the population had slipped from 111 per mile in 1983 to 22 per mile by 1987.

As concern for the grayling mounted, a group of state, federal, and private biologists advanced a proposal to preserve them. This Fluvial Arctic Grayling Workgroup, led by Montana Fish, Wildlife & Parks (FWP), assembled a restoration plan and a funding base in hopes of plucking grayling from the brink of extinction (see *Montana Outdoors*, July/August 1992).

To protect and restore fluvial grayling it was necessary to identify factors limiting their survival. Limiting factors have been likened to holes in the side of a bucket—i.e., the bucket can only be filled as high as the lowest hole. With grayling, the trick was to identify the cause of the holes and find ways to patch them.

Angling was singled out as a factor with the potential to seriously impact the grayling population, and one over which FWP had a measure of control. Grayling are notoriously aggressive feeders, making them easy to catch and highly susceptible to overharvest. Catch-and-release-only regulations were implemented in 1988, but was the regulation enough? A study was conducted to determine distribution of fishing pressure, catch rates, and hooking mortality. Results indicated that although catch rates could be high, fishing pressure is low where grayling are most abundant and they are very resistant to hooking mortality. Under normal water temperatures and flows, catch-and-release regulations amply protect the population.

Another factor that may affect grayling is competition with introduced species for food and space. During the last several summers, biologists have observed grayling interacting with rainbow, brook, and brown trout. Until these studies, grayling were thought to be delicate and vulnerable. In reality, grayling are extremely aggressive and actively defend their territories from interlopers. Brook trout tend to stay in slower water closer to cover and avoid conflicts with grayling. Brown trout also tend to be more secretive, but are voracious predators. Rainbow trout, however, share an affinity for habitat conditions favored by grayling and have the highest tendency to cause conflict. While grayling often hold their own in conflicts with rainbows, any energy spent in territorial defense can diminish their ability to survive.

Ironically, the lowest hole in the proverbial "bucket" of grayling is water: both quality and quantity. Severe drought conditions have prevailed in the Big Hole since 1985, leaving streamflows critically low and agricultural demands high. Low flows leave fish with less space, less food, less protection from predators, and higher water temperatures. In fact, water temperatures have exceeded 77 °F, the documented lethal level for grayling, during five of the last eight years.

While the whims of nature govern water supply, humans control the allocation of water from our rivers. When water is in short supply, all the needs of fisheries, agriculture, and municipalities can't be met. The only real solutions are to use limited water more efficiently or to seek alternative sources. FWP biologists have worked extensively with ranchers to find ways to maintain minimum flows in the river to protect the aquatic community. The best bet thus far has been a program that provides alternative sources of stock water, primarily groundwater wells, in exchange for closing diversions when flows become critical. That program made a stark difference between the two most severe drought years on record. In 1988, the upper Big Hole River ceased flowing for 27 days. An equally severe drought came in 1994, but due to water conservation efforts the river flowed through the entire hot, dry summer.

Along with water supply, riparian vegetation plays a key role in regulating stream flows and temperatures. Healthy streamside vegetation shades the river and keeps groundwater higher and more accessible. A recent habitat inventory of the upper Big Hole has provided a means of identifying degraded riparian areas and poor grayling habitat. Using the inventory data and knowledge of grayling habitat needs, biologists can begin designing projects to rehabilitate degraded areas.

Now that several major holes in the grayling's "bucket" are known, the recovery program can shift efforts toward patching them. As the grayling population stabilizes at healthier levels, attention can be turned toward reestablishing other populations throughout their native range: the upper Missouri drainage above Great Falls.

From early in the recovery program, the need to conserve the unique genetic resource of fluvial grayling was apparent. Montana's fluvial grayling are genetically different from those in Alaska and Canada and are behaviorally different from grayling living in

Five years ago, Montana's river dwelling Arctic grayling (right) seemed headed for extinction. But thanks to efforts by biologists and upper Big Hole River ranchers, the outlook today is encouraging. The latest FWP fish census (below) showed more than 70 grayling per mile in the Wisdom area, the highest level since 1984.

JEFF & ALEXA HENRY

lakes. Preserving this unique gene pool was necessary not only to head off extinction, but also to provide a source of fluvial fish for transplants. To capture the genetic diversity of the Big Hole grayling, fertilized eggs were collected from wild grayling for several years, the young were raised to breeding age, and the offspring interbred.

JEFF & ALEXA HENRY

The brood stock is finally diverse enough to allow restocking of fluvial grayling into suitable streams. Among the primary candidates are the upper Ruby River southeast of Dillon and the Firehole and Gibbon Rivers in Yellowstone National Park. The goal of the restoration plan is to reestablish five naturally reproducing populations within the native range by 2020.

The outlook for Montana's fluvial Arctic grayling is encouraging. In the last two years the population has responded to better streamflows by increasing to over 70 per mile in the Wisdom area, a level last observed in 1984. As limiting factors have been identified, strategies have been developed to minimize their impacts on grayling. By maintaining minimum flows through drought years, improving degraded habitats, managing potential competitors, and establishing additional populations, Montana's fluvial Arctic grayling will be with us well into the coming millennium.

WILDLIFE MANAGEMENT AREAS PROVIDE DIVERSITY

In his article "Growing Pains in the Bitterroot" (September/October issue) Mike Thompson failed to mention the greatest value of the Calf Creek and Threemile Management Areas. These areas in combination with the Skalkaho Game Preserve constitute a huge reservoir of species biodiversity. While these areas have been managed for elk for many decades, great numbers of other native species, both plant and animal, have benefited from the protection given the elk.

Even though these areas have roads through them, they are like wilderness areas in many respects. However, they protect habitat types which are not usually included in wilderness areas since they are lower in elevation. Such low elevation protected areas are critical nesting habitat for many of our declining songbird species. Located on the east side of the Bitterroot Valley, these areas also constitute the only protection of large areas of Eastside habitat and the unique biodiversity of species found only in that habitat.

Mr. Thompson indicated that the time may be past for managing the Calf Creek and Threemile Areas strictly for elk. I agree. The time has come for the Montana Fish, Wildlife & Parks to manage areas such as these in a way that will protect for future generations the amazing reservoirs of plant and animal species which have been preserved in them. Although protection of biodiversity was not the original motivation for purchasing and managing these areas, it has been a very valuable result and should now be the top priority in determining future management. We are indebted to the sportspersons who wisely decided to protect these areas. We are obligated to pass them on to future generations in as good or better condition as we received them.

In vast areas, Montana's biodiversity has been and is being destroyed. The wilderness values of unique places such as the Calf Creek and Threemile Wildlife Management Areas, which have remained relatively unchanged for many decades, will become even more appreciated and treasured in the future.—*Judy Hoy, Stevensville*

REWRITING HISTORY?

I was more than a little surprised to read your comment that the drought, weeds and the sagebrush of the '30s are what brought the antelope back (September/October issue).

I have clear recollection of discussions with my Father's good friend Elmer Johnson, member and chairman of the Fish & Game Commission in the '40s and early '50s. I have clear recollection of talking with Elmer's good friends Eddie DeBeau, and Herb Friede, game wardens and game experts. None of them had the slightest doubt that the deer and antelope made a comeback in eastern Montana for one simple reason—the coyote control was giving the animals a chance to thrive and perhaps to multiply.

Now that we all love the wolf, are we starting to rewrite Montana's history regarding predator control, and its effect on wild game?—*Robert Hurly, Glasgow*

SHUTTER ARTISTS SALUTED

Having been a long time out-of-state subscriber to your magazine, I always anxiously await your annual Special Photo Issue. Your January/February 1996 issue proves no sacrifice in high quality photography.

Although the outdoors are my true passion, I find Montana's diversity among the best of what our great country has to offer. Having only spent limited time exploring remote areas of your state, my appreciation for your dedicated photographers grows with each issue. Thousands of "arm chair" explorers like myself find needed comfort in our busy, scheduled routines of daily living by merely scanning pictorials of the great Montana. Shutter artists like John Lambing, Chuck Haney, Mike Barlow, Dusan Smetana, and the many others remind us of the burdens and beauty that faced our forefathers, as well the American Indians, who once roamed this spectacular land. Lugging backpacks full of heavy equipment deep into Montana's backcountry in search of the right bend in the river, the perfect point of contact for the eagle's catch that will feed her young, the photographer's patience is always tested. These special people deserve the utmost recognition from the reader as well as the publisher for their hard work and dedication. I'm sure I speak for all *Montana Outdoors* readers, as we *salute* those who bring the "great state" of Montana to our living rooms.—*Tom Tranchilla, Houston, TX*

Your '96 Photo Issue is an absolute masterpiece. You should be very proud. I'm very glad that I found out about your magazine. I really enjoy it. I've spent many summers in Montana, most recently as a campground volunteer with the U.S. Forest Service in Lolo National Forest near Missoula. Keep up the good work!—*Shirley Wallace, Brule, WI*

I have been a subscriber for several years and you really outdid yourself with the January/February '96 issue. Nobody could capture Montana in 37 pages of a magazine, but with this issue you have come real close. Thank you.—*John Hanner, Galveston, TX*

Just wanted to drop you a note, tell you how much I'm enjoying the January/February issue of your magazine.

Great photos and quotes—I too love the Lewis and Clark story/expedition. Keep up the good work—"*Critter*" *Don Reid, Placerville, CA*

Contributors

For most of Montana's wild creatures, survival depends on staking out and defending an exclusive piece of turf. The scientific term is "territoriality," and it partially explains why birds sing, coyotes howl, prairie dogs yip, and woodpeckers hammer on our stovepipes. "The crazy thing about this hubbub of noise and activity," says **Sam Curtis**, "is that it all has the same purpose. It's not a plot to wake us up. It's a proclamation of property rights." Curtis, whose article begins on page 2, is a free-lancer who claims a small piece of Bozeman as his territory.

Curtis

Eight years have elapsed since **Mike Aderhold** last reported on Montana's threatened and endangered species in *Montana Outdoors*. "We now have seven animals classified as endangered, and five animals and plants classified as threatened," he says. "The good news is that several of these species are in better shape than they were in 1988; the bad news is that we've added some new ones to the list." To find out how our rare species are faring, turn to page 8 for the first in a two-part series. Aderhold is supervisor for FWP's Region 4 (Great Falls).

Visitors to Freezout Lake this spring are likely to see canvasback ducks, the subject of the 1996 state waterfowl stamp, says **William Phippen**, whose story on the annual art competition begins on page 14. First place honors for his painting of canvasbacks against a backdrop of the Rocky Mountain Front at Freezout Lake went to Jim Borgreen of Lewistown, while paintings by Robert Schlenker and Cliff Rossberg took second and third. Phippen is an information officer at FWP headquarters in Helena.

When reservoir drawdowns created a dust problem following construction of Canyon Ferry Dam in 1954, engineers and biologists cooperated to solve it. In this issue's "Lands Legacy" installment (p. 17), **Bernie Kuntz** describes how an intricate system of dikes and ponds built in the 1970s became an integral part of Canyon Ferry Wildlife Management Area. The ponds, says Kuntz, along with more than 300 man-made islands, provide nesting habitat for a host of waterfowl as well as pelicans and cormorants, making the WMA one of the state's premier hunting and birding destinations. Kuntz is an information officer stationed at FWP's Bozeman (Region 3) office.

Fraley and Warren

State and federal agencies, especially those with differing responsibilities, sometimes disagree on solutions to resource problems. But according to **John Fraley** and **Greg Warren**, who served on the interagency committee charged with developing a joint management framework for the Bob Marshall Wilderness Complex, "Getting Together" (p. 21) makes a lot of sense. Fraley is an FWP information officer in Kalispell and Warren is wilderness and staff officer for the Flathead National Forest. They would like to thank other members of the interagency committee (Tom Wittinger, Tim Love, and Anne Zimmerman from the U.S. Forest Service, and Tom Flowers, Rich Clough, Harvey Nyberg, Mike Aderhold, and John McCarthy from FWP), as well as members of the public, for help with the article.

Prior to last spring's turkey season, **Terri Adams** of Sidney had never been turkey hunting. "I liked the outdoors," she says, "but as the mother of three young boys under the age of five, I didn't feel I had the time to go traipsing over the river and through the woods. I'd sing the song if I wanted to feel woodsy." But listening to her husband and his friends tell hunting stories around the table one night convinced her she was missing out on a lot of fun, and a few days later she found herself "doing a camo-clad impersonation of Groucho Marx." To learn how "Mama and the Bird" finally met one sunny afternoon along the Yellowstone River, turn to Adams' story on page 28.

Adams

MO thanks the following artists and photographers for their contributions to this issue: **Erwin and Peggy Bauer**, Livingston; **Jim Borgreen**, Lewistown; **Alan and Sandy Carey**, **Diane Ensign**, and **Robert Schlenker**, Bozeman; **Steve Ellis**, **Dave McGee**, **Alan G. Nelson**, **Cliff Rossberg**, and **Rodney Schlecht**, Great Falls; **Harry Engels**, Clancy; **Jeff and Alexa Henry**, Emigrant; **Cathy and Gordon Illg**, Golden, CO; **Donald M. Jones**, Troy; **Nelson Kenter**, Missoula; **Bill Marchel**, Fort Ripley, MN; **A. Nadine Pickthorn**, Fort Peck; **Michael S. Quinton**, Slana, AK; **Conrad Rowe**, Seeley Lake; **Tom J. Ulrich**, West Glacier; **Paul Valcarce**, Idaho Fish and Game; and **Steve Wirt**, Whitefish. Thanks also to the following contributors who work for the department: **Tom Carlsen**, Townsend; **John Fraley**, Kalispell; and **Jim Liebelt**, Fort Peck.

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